



WST2

Washington State Technology Transfer



2001 Contract Administration Awards pg **36**

Land Cover Mapping in King County pg **25**

Pavement Warranties pg **22**



**Washington State
Department of Transportation**

A Technical Newsletter of
the Washington State Department of Transportation (WSDOT) and the Local Technical Assistance Program (LTAP)
Issue 74, Spring 2002

Washington State Technology Transfer

WST2 Washington State Technology Transfer

is published quarterly without fee in
February, May, August, and November

by WSDOT Highways & Local Programs
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Olympia, WA 98504-7390

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Home Page: www.wsdot.wa.gov/TA/T2Center/T2hp.htm

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SchmidW@wsdot.wa.gov, or phone (360) 705-7386,
or WST2 Center, PO Box 47390, Olympia, WA 98504-7390.
Subscriptions are served free of charge.

Issue 74, Spring 2002

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Article contributions, questions, or comments are welcome.
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Technology News

<i>The Pacific Northwest Snowfighters Organization: Why It Was Formed and Why You Should Attend Their Conference This Summer</i>	4-6
<i>Governor Locke Signs Safety Belt Legislation That Will Save Lives and Tax Dollars</i>	6
<i>2002 Pacific Northwest Transportation Technology Expo — Moses Lake</i>	7
<i>New Highways & Local Programs Director Appointed</i>	8
<i>WST2 Welcomes Brian Walsh, the New WSDOT Local Traffic Services Engineer!</i>	8
<i>Grant Application Announcement</i>	9
<i>For the Good of the Environment: AGC of Washington Education Foundation Partners with Local DOT — New Statewide Training Program A Tremendous Success</i>	10-11

Articles

<i>Cell Phone Use by Motor Vehicle Drivers in Washington State</i>	12-15
<i>Innovative Traffic Control Devices — The Rulemaking Process and Public Comment (Part II)</i>	16-18
<i>WST2 Center Partners with Insurance Corporation of British Columbia (ICBC)</i>	19
<i>Riding in the Cargo Area of Pickup Trucks: Increased Risk of Injury and Death</i>	20-21
<i>Pavement Warranties — A Developing Trend</i>	22-24
<i>Comprehensive Land Cover Mapping in King County: Capitalizing on the Strengths of High & Low Resolution Multi-Spectral Imagery</i>	25-27
<i>Ride Quality Specification Contracting</i>	28-29
<i>Introducing the Pavement Technology CD Library</i>	29

Departments

<i>From the Editor's Desk</i>	3
<i>PQT News</i>	34-39
<i>Colville 2000 Project Receives National Recognition</i>	34
<i>Partners for Efficiency</i>	35
<i>2001 Partnership of Excellence in Contract Administration Award Winners</i>	36-38
<i>Bringing Together Multimodal Transportation</i>	39
<i>NWPMA News</i>	40-41
<i>Word from the Chair</i>	40
<i>Deanna S. Peck</i>	41

Departments (Continued)

<i>USDOT-NHTSA/FHWA</i>	42-43
<i>Is that "More Secure" Mailbox Really Safe?</i>	42
<i>A New and Improved High-Performance Concrete</i>	43
<i>BTEP</i>	44-45
<i>Portable Speed Bump Keeps a Safe Work Zone Around Flaggers</i>	44-45
<i>Roger's Technology Toolbox</i>	46-49
<i>Data Mining and Digging for Gold in Your Own Backyard</i>	46-47
<i>GIS Making Headway at Conservation Districts</i>	47-49
<i>Build a Better Mousetrap</i>	30-33
<i>WSDOT Aberdeen Maintenance Shop's Chip Seal Hitch</i>	30-31
<i>The Bobcat Grinder Asphalt Screed</i>	32-33
<i>"Better Mousetrap" Submittal Form</i>	57
<i>Publications From Your WST2 Center</i>	50-51
<i>Training</i>	52-56
<i>Training Opportunities</i>	52-56
<i>Resources</i>	58-59
<i>Sign Of the Times</i>	60



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*Dan Sunde
Director of Technology Transfer
WST2 Center*

I'd like to take this opportunity to wish Ed Lagergren the best in his new career move within the WSDOT Traffic Office and to thank him for the years of service to Washington's local agencies as the WSDOT Traffic Services Engineer. For well over 10 years Ed has been the on-call traffic engineer for cities and counties and a driving force behind the Urban Traffic Engineer's Council, UTEC. We in the WST2 Center have appreciated Ed's cooperation, support, and sincere desire to assist Washington's local agencies. Best wishes, Ed.

At the same time I would like to welcome Brian Walsh as the new Traffic Services Engineer. Brian's experience with design, roundabouts, and the Collision Corridor Program will be valuable assets to local agencies and a tremendous resource to the WST2 Center. I look forward to a strong continuing partnership with the Traffic Services Engineer as we work together to provide you the best services possible. Welcome Brian.

We are pleased to report that the WST2 Training Program is alive and well even in these tight financial times. As of this printing we have almost seventy classes scheduled in 2002 with more coming. This is due to the direct support of the WSDOT executive management who recognize the need and value of training. Next time you see them you might thank them for their support. It's also due to a dedicated training staff who know how to squeeze everything they can out of every penny we have. A special thank-you to Laurel Gray, WST2 Training Program Coordinator, and Wendy Schmidt WST2 Training Operations Coordinator, who make it happen.

As things get tighter financially, we will remain committed to doing our part to present you with ways to do things better and smarter. We're on the brink of Construction Season 2002 and we wish you all the best as you continue to "do more with less".

Dan Sunde
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The Local Technical Assistance Program (LTAP) is a national program financed by the Federal Highway Administration (FHWA) and individual state transportation departments. Administered through Technology Transfer (T2) Centers in each state, LTAP bridges the gap between research and practice by translating state-of-the-art technology into practical application for use by local agency transportation personnel.

Any opinions, findings, conclusions or recommendations presented in this newsletter are those of the authors and do not necessarily reflect the views of WSDOT or FHWA. All references to proprietary items in this publication are not endorsements of any company or product.

 **Washington State
Department of Transportation**


U. S. Department of Transportation
Federal Highway Administration

The Pacific Northwest Snowfighters Organization

Why it was Formed and Why You Should Attend Their Conference This Summer

By Dave Jones, Maintenance Engineer, Idaho Transportation Department

Introduction

Over the last three years, I have been involved with an incredible and dedicated group of people; the Pacific Northwest Snowfighters or PNS for short. The PNS members aren't "suits". We are the folks that get things done. And the meetings aren't the "mutual admiration" variety one often sees when some transportation folks get together to talk shop. These meetings produce results you can use and generally use immediately.

The main purpose of the PNS is to test and approve anti-icer/deicer products used by transportation agencies in our states and province, and we keep vendors involved in the testing of these products. PNS asks vendors for help in solving problems and addressing concerns so that everyone is a part of the answer and solution. This way of doing business promotes cooperative problem solving and leads to buy-in from all parties who participate.

The main purpose of the PNS is to test and approve anti-icer/deicer products used by transportation agencies in our states and province...

The goal of the PNS is to get the best available anti-icer/deicer products tested, approved, and available to the regional transportation agencies. This can be a challenge when you look at the wide geographic area that PNS covers.

History

Vendors of winter maintenance chemicals were frustrated by the lack of uniformity in the specifications for their products throughout the Northwest. Transportation agencies within the states of Washington, Oregon, Montana, and Idaho formed an informal group with vendors of anti-icing/deicing products several years ago to develop a set of regional specifications for chemicals related to snow and ice control. Later, representatives from the province of British Columbia joined and the group evolved to become the Pacific

Northwest Snowfighters (PNS) Association. The association is comprised of technical experts in the fields of chemistry, environment, maintenance operations and management, insurance law and claims, public affairs, and purchasing. Members have been privileged to work with the foremost pioneers in anti-icing technology.

The members share the Columbia-Snake River Basin drainage and other similar geographic, climatic, and environmental conditions that govern the choice of chemicals, work methods, and equipment for snow and ice control. Although the focus of the specifications has been protection of sensitive resources specific to the Northwest, numerous agencies throughout North America with winter maintenance responsibilities have committed to adopt the specifications, based on environmental and performance considerations.

The mission of the PNS, is first and foremost, to provide specifications for the highest quality products balancing quality of environment with providing the safest possible transportation system and maximum mobility for the traveling public during snow and ice conditions within reasonable budgetary, product performance, and environmental constraints. Stringent quality control elements have also been developed in conjunction with manufacturers, distributors, and

transporters that will enable users to track product quality through batch and lot numbering systems.

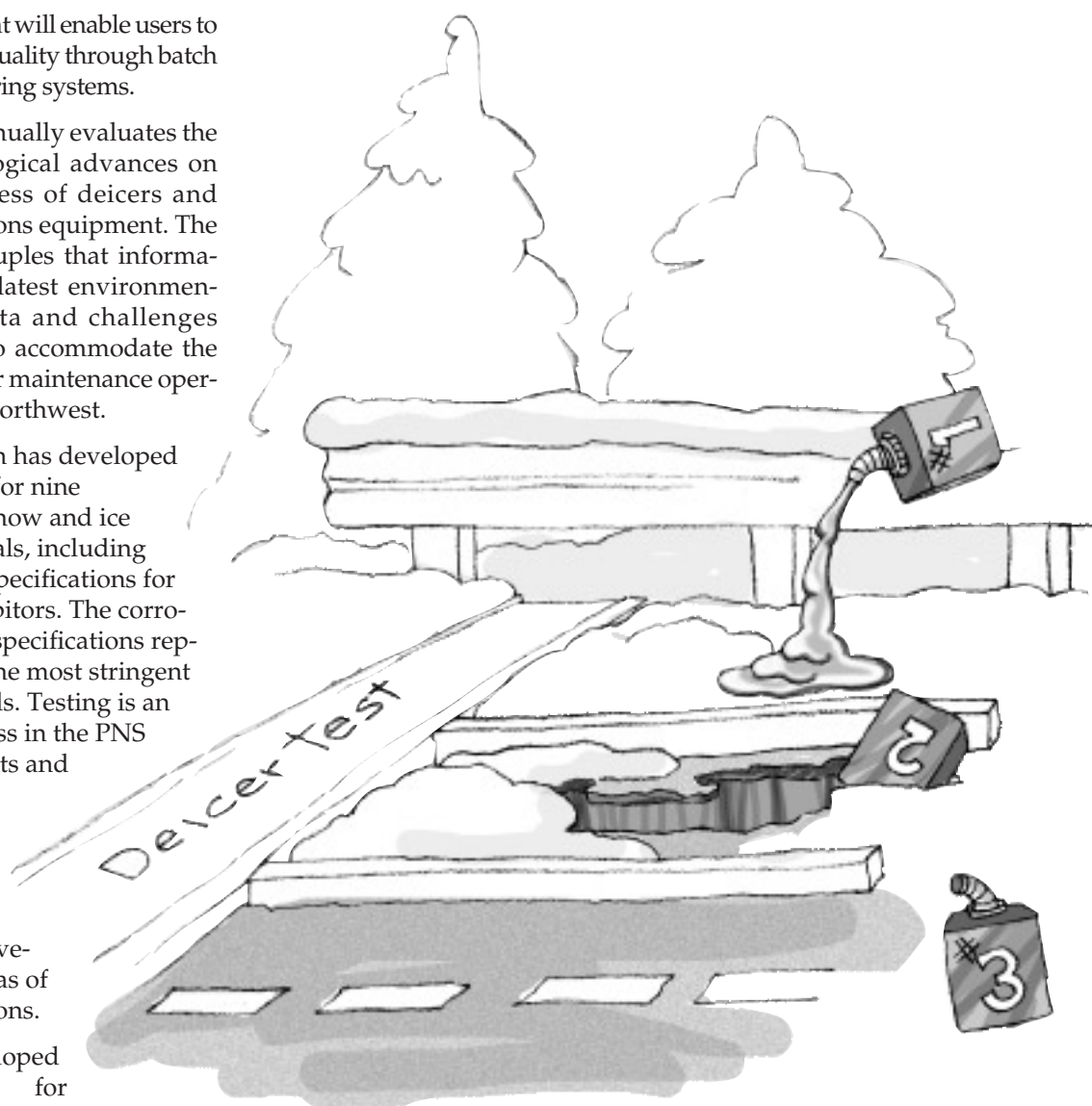
The PNS continually evaluates the latest technological advances on the effectiveness of deicers and winter operations equipment. The association couples that information with the latest environmental impact data and challenges the industry to accommodate the needs of winter maintenance operations in the Northwest.

The association has developed specifications for nine categories of snow and ice control materials, including performance specifications for corrosion inhibitors. The corrosion inhibitor specifications represent one of the most stringent testing methods. Testing is an ongoing process in the PNS as new products and equipment are continually being evaluated in the spirit of continuous improvement in all areas of winter operations.

The PNS developed specifications for numerous categories of products to enable users to choose from a wide range of the best products available on the market. By consolidating the resources and purchasing power of the member

agencies, the association anticipates that the quality and cost of these products will become more favorable and are considering

the challenges and feasibility of developing a contract for use by the entire PNS membership.



The association is seeking any interested governmental bodies and transportation agencies to adopt these specifications and to provide input to the association to further refine the specifications in the future. Through the PNS web site, you are able to access information about PNS, products and related reports as well as become a member of the organization.

For more information about PNS, visit the following web page:
www.wsdot.wa.gov/fossc/maint/pns/.

Conference

It's amazing what can happen when people come together to communicate; that communication was the seed that formed the PNS several years ago. The PNS is various highway agencies doing what they can to make travel safer, various vendors marketing products to make travel safer, and the two camps coming together to discuss how best to pool their efforts so that everyone benefits. What a concept!

Today we find ourselves building upon our past efforts to enhance public safety, providing year round access to the transportation network which is the economic engine in the Pacific Northwest, and working together to find common solutions to universal problems we all face. The easy tasks are behind us. We are now faced with more challenging issues and concerns.

One of the more challenging aspects of winter maintenance is sharing what you have learned, being made aware of what you don't know, and finding sources of information to bridge the knowledge gap. Within an agency, this is no small undertaking. Spread across North America, the job becomes daunting.

For the past two years, the vision behind PNS Snow Conference has been to bridge the knowledge gap in innovative winter maintenance

practices and to exchange information to expand our collective knowledge. The format has changed slightly since the first gathering, but the focus has always been on communication.

At this year's conference, the theme will be knowledge exchange. There will be presentation sessions, panel discussions, and workshops delivered by leaders in winter maintenance. Technical programs will be aimed at the field level operators and first line supervisors as well as program managers. The tradeshow will include the best of the best in equipment, products, and services for the winter maintenance professional. And to enhance your experience at the conference, we have arranged to have Captain Gerald Coffee (Retired) deliver a motivational keynote address on his experiences in overcoming adversity, embracing change, the values of teamwork, clear communication, and leadership.

The conference will be held June 3-5 at the Boise Center on the Grove in downtown Boise, Idaho in a beautiful park-like setting. The conference will also host a winter maintenance tradeshow June 3-4 at the Bank of America Center right next door. Close to many interesting areas to tour, magnificent shopping facilities and abundant summer recreation opportunities, the possibilities are endless for your stay in the fine city of Boise.

Please join us this year. You won't be disappointed.

For more information about the 2002 PNS Snow Conference, visit the following web page:
www.pnsconference.com/pns2002/home.html. ▲

Governor Locke Signs Safety Belt Legislation That Will Save Lives and Tax Dollars

*Office of the Governor
April 2, 2002*

OLYMPIA — Gov. Gary Locke signed House Bill No. 1460, Seat Belt Legislation, April 2, 2002, that is expected to save lives, prevent injuries, cut emergency room costs, and reduce insurance premiums.

The legislation, sponsored by state Representative John Lovick, brings uniformity to the state's safety belt enforcement laws by authorizing law enforcement to stop a vehicle and issue a traffic citation for failure to wear a safety belt.

For more information, contact the Governor's Communications Office, 360-902-4136 or visit the governor's homepage at www.governor.wa.gov.



2002

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Transportation

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Grant County Fairgrounds, Moses Lake, WA

Featuring

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For Information: Go to our web site, <http://capps.wsu.edu>, or call 509.335.3530

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New Highways & Local Programs Director Appointed



Kathleen Davis has recently been appointed to the position of Director of Highways & Local Programs (H&LP) after serving as Acting Director for the past several months. Kathleen has been with WSDOT for approximately 20 years and with H&LP since 1992 as Program Management Director. In her former capacity, she was responsible for all program

management functions within the division, including planning, project development and contract administration. Kathleen's vision for the organization includes developing stronger partnerships with external and internal customers. Kathleen will be glad to hear from you at any time. Her direct line is (360) 705-7871. ▲

WST2 Welcomes Brian Walsh!



WST2 is pleased to welcome Brian Walsh, P.E. the new WSDOT Local Traffic Services Engineer. Brian succeeds Ed Lagergren who accepted a new assignment within the WSDOT Traffic Office. Prior to his new appointment, Brian held

the position of WSDOT Corridor Safety Program Manager. He has over 15 years of experience (10 in government work) in the traffic engineering field and has been involved performing traffic studies and traffic design on projects in various parts of the country including California, North Carolina, Texas, Tennessee, and Virginia.

Brian has a broad background working with Washington communities and agencies on statewide traffic safety initiatives during the past nine years. He assumes this new position with a thorough understanding of issues that affect communities with reference to transportation and traffic

engineering concerns. Brian will continue in a supporting role of the Urban Traffic Engineers Council (UTEC).

The WST2 Center looks forward to working with Brian and expanding the excellent working relationship we have with the Traffic Office. Brian is dedicated to expanding local, state, and federal partnerships to provide continued improvement of services to local agencies in Washington.

If you need assistance from Brian, give him a call at (360) 705-7297 or email him at WalshB@wsdot.wa.gov. ▲

Grant Application

Deadline May 31, 2002

The Washington Traffic Safety Commission (WTSC) is now accepting grant applications for the 2003 funding cycle that begins October 1, 2002.



Applications must support the WTSC's primary goal of reducing the number of deaths and serious injuries that result from traffic crashes. Supporting goals of the WTSC consist of improving traffic safety in the following areas, with Impaired Driving and Seat Belts being our highest priority:

- Impaired Driving
- Occupant Protection
- Emergency Medical Services
- Speeding and Other Driver Behaviors
- Traffic Records
- Pedestrian and Bicycle Safety
- Motorcycle Safety
- Community/Local Traffic Safety
- Young Drivers
- Pupil Transportation and School Walkway Safety

Typically, projects range from \$800 to \$500,000 each, but there is no formal upper limit. Projects receiving substantial funding should address issues on a regional or statewide level.

Eligible applications include:

- state agencies; cities and county governments, as well as departments within those organizations;
- schools; non-profit organizations with existing 501 status; and
- Indian Tribal governments.

Law enforcement agencies are encouraged to apply for grants that do not include standard police equipment (i.e., portable breath testers, radar units, radar reader boards, etc.). These items are funded to law enforcement agencies through other WTSC grant

sources. For information regarding law enforcement equipment grants, please contact Les Pope, (360) 586-3872, or lpope@wtsc.wa.gov.

These grants are given on a "cost reimbursement" basis. Examples of allowable project costs include:

- Strategies to Improve Traffic Safety
- Traffic Records Systems
- Public Education Campaigns
- Studies
- Equipment and Materials
- Training and Travel

Examples of unallowable costs include:

- Funds that Supplant Existing Budgets
- Office Furniture and Fixtures
- Roadway Construction or Maintenance

Four Ways to Receive a Grant Application Package (please use only one)

1. Visit our web site at www.wa.gov/wtsc/grants, on or after March 15 to get the application package, or
2. Call to request it at (360) 753-6197, or
3. E-mail a request to tjessie@wtsc.wa.gov, for an electronic copy, or
4. Fill out and fax this page to (360) 586-6489.

Name _____ Organization _____ Telephone Number _____
Address _____ City _____ State _____ Zip _____

Grant packages requested via the fax sheet or phone call will be mailed within two business days of receipt.

For the Good of the Environment

AGC of Washington Education Foundation Partners with Local DOT — New Statewide Training Program a Tremendous Success

Reprinted with permission.

By David Hymel, Continuing Education Director, AGC of Washington Education Foundation

General contractors face increasingly complex rules designed to keep construction site storm water discharges clean, but how do they keep up with all the new requirements? Environmental education reduces erosion-related expenditures and exposure to liability by keeping contractors informed of their environmental responsibilities on the jobsite. The AGC of Washington Education Foundation has proven that partnering with state and local regulatory agencies is a good way to provide this needed education.

Regulatory Program History

Erosion issues dominate the environmental landscape in Washington state, where salmon and other species have been listed as endangered or threatened in virtually every major watershed. To improve compliance with water quality laws during construction, the Washington State Department of Transportation

(WSDOT) requires contractors to participate in erosion control training. Contractors must have certified erosion control leads on staff to be eligible to work on WSDOT projects. Certification as an erosion control lead is granted for a three-year period after completion of a two-day course.

In its 2001 Stormwater Manual for Western Washington, the Washington State Department of Ecology (DOE) issued further restrictions, requiring erosion and spill control lead certification for work on most general building construction projects in Western Washington.

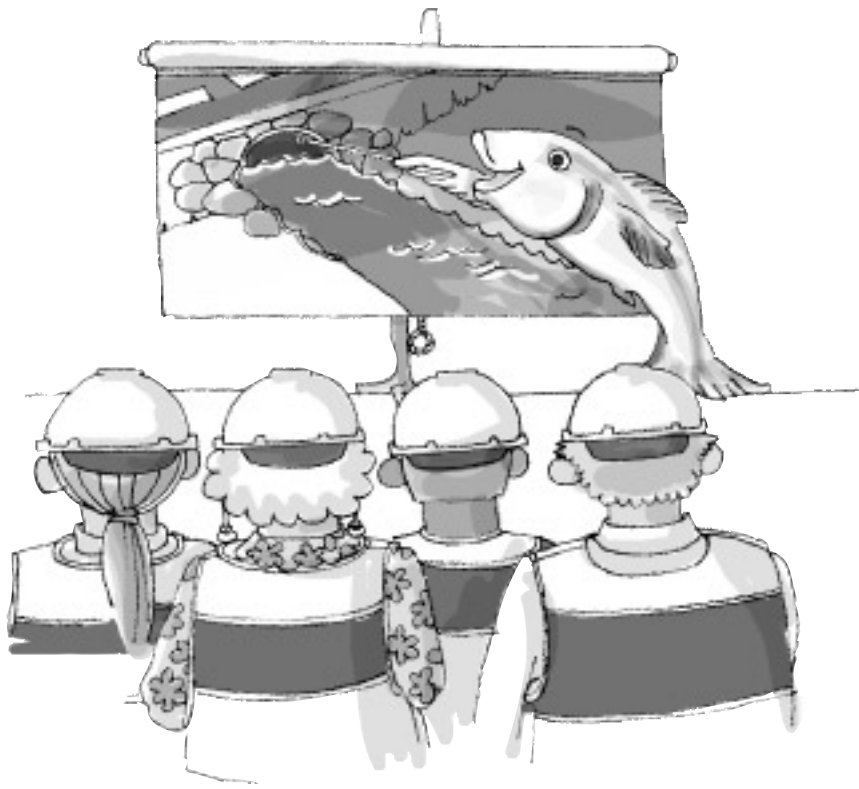
These new restrictions, coupled with the recent addition of several species of salmon to the endangered and threatened species list in Washington state, triggered a dramatic increase in demand for erosion control training. To meet this demand, WSDOT entered into a partnership agreement with the Education Foundation in June 2000. The Foundation worked with WSDOT's curriculum to deliver a statewide training program to contractors and staff from federal and state agencies, as well as county and local jurisdictions. The erosion



John Pearch of the WSDOT Environmental Affairs Office leads soil erosion trainees on a field trip to a state highway construction site near Olympia, Washington.

control training program offered by the Education Foundation is recognized by the Department of Ecology's Stormwater Manual as meeting the erosion and spill control lead certification requirements.

With this partnership, the Education Foundation assumed a leadership role in construction site environmental training within the industry. According to Scott Carey, WSDOT's statewide erosion control coordinator, "the Education Foundation's training is largely responsible for the steady improvement we're seeing in the quality of contractors' erosion control work."



Initially, an ambitious, statewide schedule was planned to conduct 18 training events for 600 students in 10 months (September 2000 to June 2001). However, due to increased interest and demand, the Education Foundation completed twice the number of events intended. By the end of the program, nearly double the anticipated number of students received certification as erosion control leads.

Soon it became apparent that the need for environmental training had grown beyond soil erosion control. The DOE's Stormwater Manual requires submission of written storm water pollution prevention plans (SWPPPs), but until recently there was no formal training available to general contractors on how to write, update, or maintain a quality erosion and sediment control plan. In addition, contractors in western Washington are facing more restrictions when working in wet winter weather—unless they have a plan to adequately treat turbid construction

Delivering these programs has raised environmental awareness of the construction community and has made a significant contribution towards preserving the natural resources of this region.

storm water before it leaves the site. To address these situations, the Foundation added three courses to its environmental lineup: Storm Water Pollution Prevention Plans for Construction Sites; Construction Site Storm Water Treatment; and Erosion Control Design.

Challenges & Opportunities

Environmental training has become a primary component of the Foundation's training mission. A small staff is able to maintain its extensive list of construction education training only by entering into a variety of partnerships and soliciting support from the construction industry.

The Foundation's environmental program is sustained by class tuition and by creative support from its sponsors:

- The Port of Seattle of Seattle, Wash., a port authority and leader in public works environmental protection (www.portseattle.org);
- Master Builders of King and Snohomish Counties of Bellevue, Wash., a model construction trade association that developed Built Green™, a program that educates builders and consumers about environmentally friendly building techniques (www.mba-ks.com); and
- SI Geosolutions of Chattanooga, Tenn., provides advanced construction materials for soil stabilization and erosion control and nationwide stormwater management training seminars (www.fixsoil.com).

Providing these services allows the Education Foundation the opportunity to develop a leadership role in Washington's construction industry for environmental training. Delivering these programs has raised environmental awareness of the construction community and has made a significant contribution towards preserving the natural resources of this region.

For more information, contact David Hymel, (206) 284-4500, or on-line at dhymel@agcwa.com www.constructioned.com www.agcwa.com/soil.asp. ▲

Cell Phone Use By Motor Vehicle Drivers In Washington State

*By Phillip Salzberg, PhD,
Research Investigator, and John
Moffat, Director, Washington
Traffic Safety Commission
(WSTC)*

The issue of cell phone involvement in traffic collisions has generated much discussion recently. The debate seems to be focused on anecdotal reports of persons driving carelessly or erratically while talking on cell phones. However, there have been few studies or data presented that attempt to quantify whether cell phones pose a safety risk. A recent WTSC report provides a summary of the research literature addressing this issue (Doane, 2001).

A determination of the rate of involvement of cell phones in traffic crashes requires two data elements, neither of which is presently known in Washington State. The first is the incidence of cell phone use by drivers in crashes. This information could potentially be obtained from police crash investigation reports where officers were asked to identify

whether cell phone use by a driver was a factor contributing to the occurrence of the crash. There are however, numerous difficulties for police officers in making such a determination. The second element is the incidence of cell phone use by all drivers operating vehicles on Washington roadways. Thus, if it were known, for example, that 5% of all drivers are using cell phones at any given time and that cell phones were identified as a contributing factor in 10% of all crashes, it could be concluded that drivers using cell phones are over-represented in crashes.

The purpose of the present study is to ascertain the incidence of cell phone use by drivers in Washington State. As part the WTSC annual observation survey of seat belt use, additional data were collected on cell phone use in the 2001 survey. While collecting the data on belt use, the survey observers also noted and tallied the number of drivers using hand held cell phones.

Survey Methods

Sample Design and Observation Sites

A consulting firm, WESTAT, designed the survey to provide a statistical estimate of the overall statewide seat belt use rate. The roadways in the sample are a probability sample of all road segments in the state. All 39 counties in Washington were eligible for selection in the sample. A total of 18 counties were selected; nine from western Washington and nine from eastern Washington. The three most populous counties in each half of the state were first selected with certainty, and then six additional counties from each half of the state were selected with a probability based on vehicle miles of travel (VMT) in each county. Roadways were grouped into major roads (primarily state routes and interstate highways) and local roads. Road segments were clustered within sample counties and census tracts and then randomly selected with a probability based on VMT. A detailed description of the

sampling and survey methodology can be found in the first WESTAT report (WESTAT, 1986). The sample included 402 roadway sites. The survey design specified the precise location for each observation site, including the direction of travel that was to be observed.

Sites were grouped in clusters based on geographic proximity in order to minimize the observer's travel time. Clusters were randomly assigned to days of the week, and sites were randomly sequenced within each cluster. All seven days of the week were included in the sample. The survey personnel would typically observe 5 sites per day between the hours of 8 AM and 5 PM. Thus the survey results can only be generalized to daytime hours. The roadways were observed from the shoulder or sidewalk adjacent to the road or from an overpass, if possible.

Trained observers collected the survey data. Many of these observers were retired police officers. The survey coordinator, also a retired police officer, trained and monitored the observers. Each



The use of cell phones was recorded independently of seat belt use; thus, correlating belt use and phone use was impossible. Cell phone observations were limited to hand-held devices; hands-free phones were excluded from the survey.

roadway site was observed for 80 minutes, and four different types of vehicles were observed during four separate 20-minute data collection periods. The vehicle types were passenger cars (including station wagons), pickup trucks, sport utility vehicles (SUVs), and passenger vans.

Survey personnel observed shoulder belt use of drivers and right-front seat passengers. Cell phone use was observed for drivers only. Belt use (and non-use) was recorded using a mechanical counting device. Observations of cell phone use were recorded on a separate data sheet. At the end of each 20-minute observation period the driver and passenger seat belt counter totals and the driver cell phone total were entered on a data collection form. The use of cell phones was recorded independently of seat belt use; thus, correlating belt use and phone use was impossible. Cell phone observations were limited to hand-held devices; hands-free phones were excluded from the survey.

Results and Discussion

There were 2,781 drivers observed using a hand held cell phone out of 78,754 total drivers. The overall Statewide cell phone use rate was 3.53%.

Table 1 summarizes the cell phone data for each of the counties in the sample. The use of cell phones tended to be greater in western Washington counties and especially those counties located on the Interstate 5 corridor. The rates also tended to be higher in counties with major urban areas, e.g., King county (Seattle), Pierce County (Tacoma), and Snohomish County (Everett). The highest cell phone use rate was found in Whatcom County, which borders British Columbia, Canada.

Table 1

**Cell Phone Use Rates By Drivers,
Washington State, 2001**

County - (E/W) (I-5 Corridor)	Cell Phone Use Rate
CLALLAM (W)	2.03%
CLARK (W) (I-5)	2.55%
COWLITZ (W) (I-5)	4.33%
GRANT (E)	0.95%
KING (W) (I-5)	4.53%
KITTITAS (E)	2.42%
KLICKITAT (E)	0.34%
LINCOLN (E)	1.19%
MASON (W)	0.15%
PIERCE (W) (I-5)	3.05%
SNOHOMISH (W) (I-5)	3.53%
SPOKANE (E)	2.55%
STEVENS (E)	1.20%
THURSTON (W) (I-5)	4.04%
WALLA WALLA (E)	0.82%
WHATCOM (W) (I-5)	5.27%
WHITMAN (E)	2.70%
YAKIMA (E)	0.94%
STATEWIDE TOTAL	3.53%

The rate of cell phone use also varied by the type of vehicle. The highest rates were found for drivers of sport utility vehicles and vans, 4.59% and 4.23% respectively, while the lowest rate was found for passenger cars, 2.91%. Table 2 summarizes the rates by the type of vehicle.

Table 2

**Cell Phone Use Rates
By Type of Vehicle**

PASSENGER CAR	2.91%
PICKUP TRUCK	3.76%
SPORT UTILITY VEH.	4.59%
VAN	4.23%
TOTAL	3.53%

The 3.53% rate of cell phone use for Washington State that was obtained in this survey is comparable to a recent National Highway Traffic Safety Administration survey that found a national rate of 3.0% (Utter, 2001); although higher than the 2.2% rate was found for the West Region of the country.

An important limitation of this survey is that the findings can only be generalized to the daylight hours when the observation data were collected, i.e., 8AM to 5PM. In addition, the observations were limited to hand-held phones used by drivers of passenger vehicles.

The results from the present survey provide a denominator that could be used for an estimate of the rate of cell phone involvement in traffic crashes in Washington State. Obtaining a numerator to calculate this rate should be approached cautiously, however. There are different methods that could be used to estimate the number and percentage of traffic crashes where a cell phone was in use, each with potential biases and limitations. Possible methods include the following:

1. Police traffic crash reports could be modified so that an investigating officer could indicate whether the driver had been using a cell phone at the time of the crash. This determination, in the majority of cases, would require asking the driver if a cell phone had been in use. The obvious bias is a negative response from the driver in an attempt to avoid culpability for the crash.

2. An in-depth follow-up investigation of the telephone billing records for a sample of crash-involved drivers might reveal the incidence of cell phones that had been in use on the same dates and times of the crashes. However, this type of study would require a substantial investment of resources.

3. A questionnaire survey of a sample of drivers could be used to examine the prevalence of cell phone use in motor vehicle crashes. The drawbacks of this method are the biases inherent in self-reports, distortions in memory of crash events, and volunteer bias among those who choose to participate in questionnaire surveys.

The findings of this study (3.53% use rate) indicate that at any given time during daylight hours approximately 3 or 4 out of every 100 drivers of passenger vehicles will be using a cell phone while traveling on Washington roadways. ▲



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Innovative Traffic Control Devices

The Rulemaking Process and Public Comment (Part II)

By Tamara Broyhill, Carol Tan
Esse, and Louisa Ward

This article is the second in a two part series explaining the process of implementing a new or innovative traffic control device or application.

Part I described how to experiment with an innovative traffic control device, including: the advantages of experimental status, how to request experimental status from the Federal Highway Administration (FHWA), how the FHWA reviews and approves experimental traffic control devices, what the FHWA defines as a successful experiment, and how to fund experimentations. The article also provided an example of a successful experiment and implementation of a new traffic control device--the "fluorescent yellow green (FYG)" warning signs that are used for school, pedestrian, and bicycle-related warning signs.

Part II will provide an explanation of how changes, such as incorporating a new device into the Manual on Uniform Traffic Control Devices (MUTCD), are adopted through the Federal Register rulemaking process, beginning with the publishing of a Notice of Proposed Amendment (NPA). Further discussion of the FYG example is included.

The NPA and Process for Public Comment

Periodically, the FHWA decides that the MUTCD may need to be amended. The process used to amend the MUTCD is informal rulemaking as prescribed in Section 553 of the Administrative Procedure Act (APA) (5 U.S.C. §553). The informal rulemaking process is also referred to as a notice and comment rulemaking.

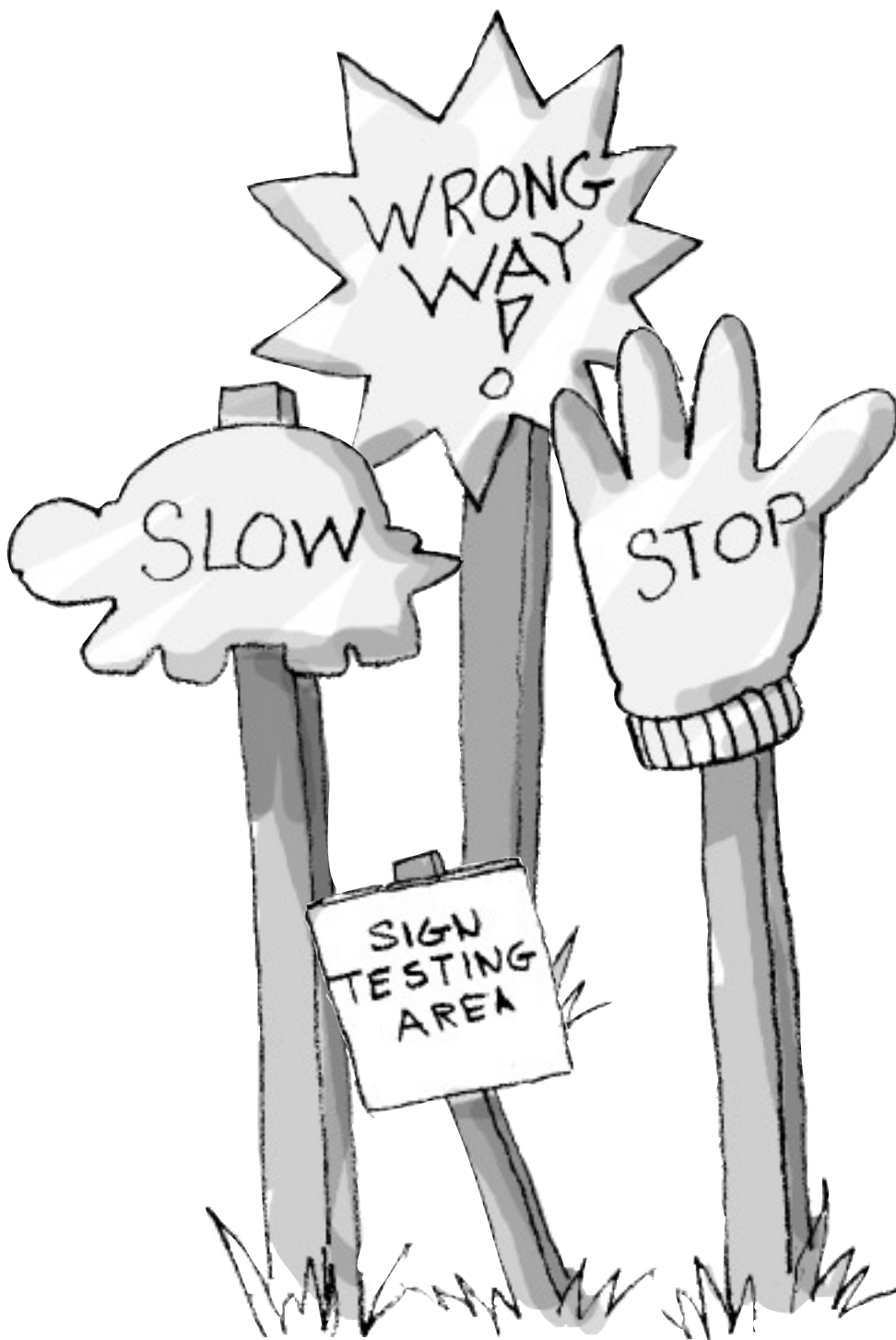
The APA requires that a notice of proposed amendment (NPA) to any Federal regulation be published in the Federal Register. The Federal Register is a government agency document that is published and available for inspection every business day. It may be accessed on the Government Printing Office's homepage (www.nara.gov/fedreg). An NPA is an official notification to the public that the FHWA is proposing to add new or revised information to the MUTCD. The NPA contains the proposed text change for the MUTCD. For example, the following language was used in the June 7, 1996, NPA for the FYG sign:

The FHWA proposes to adopt the use of fluorescent yellow green as an optional color for the Pedestrian Crossing Sign (W11-2), Bicycle Crossing Sign

(W11-1), School Advance Sign (S1-1), School Crossing Sign (S2-1), and School Bus Stop Ahead Sign (S3-1).

The NPA also provided an explanation for the change. The overall results of the evaluations at several local agencies indicated that FYG warning signs produce a marginal improvement in perceived safety at crossing sites. At three of the eight crossing sites studied, the results of the evaluation showed a significant reduction in the number of pedestrian vehicle conflicts, as well as a significant increase in the percentage of vehicles stopping or slowing. Public opinion surveys reflected a strong indication that the FYG warnings do stand out and were associated with the need for caution.

Public/private entities and private citizens are invited to participate in "changing" the MUTCD by reviewing the notice published in the Federal Register and providing their comments either electronically (<http://dmses.dot.gov/submit>) or by writing a letter detailing their comments to the U.S. DOT's Docket on the various rulemakings proposed at any given time. Based on review and analysis of the comments, the FHWA may modify, rescind, or finalize the proposed change.



Public opinion surveys reflected a strong indication that the fluorescent yellow green warnings do stand out and were associated with the need for caution.

Review of NPA Comments and Implementation of Final Rule

The Docket Management Facility provides copies of comments on the NPA to the FHWA's Office of Transportation Operations. Once the public comment period is over, the comments are recorded and analyzed. Close attention is given to evaluating the traffic engineering improvements, traffic engineering practices, safety data, and other scientific data if provided through research or comments. Before any changes are made to the MUTCD, the FHWA must address certain considerations. These include research evaluation studies, safety and operational issues, as well as financial impacts to the State and local highway agencies responsible for implementing the proposed change(s). Scientific and qualitative safety data is very important to FHWA's support of any proposed

change. When the FHWA considers a comment about a proposed standard, it is very important that rationale/justification for the proposal be included. Based on review and analysis of the comments, the FHWA may modify, rescind, or finalize the proposed change.

In the case of the FYG warning sign, the FHWA received 141 comments in response to the proposed amendment: 110 of those agreed with the FHWA's position, 21 were opposed, and 10 were either undecided or suggested changes. For example, several of those commenting believed the use of FYG signs should have been implemented as a mandatory (shall) condition in the MUTCD, rather than an optional condition as proposed in the NPA. However, the FHWA determined that designation of FYG as an option fits in with the present character of the MUTCD, which for some devices allows State and local transportation agencies to determine if the use of the particular traffic control devices would be beneficial in their jurisdiction. Based on the above, the FHWA developed a Final Rule (published on June 19, 1998 at 63 FR 33546), which included the decision to allow FYG as an Option as well as a summary of the other comments and concerns.

Final Rule and Implementation of Changes

A Final Rule is developed taking into consideration the comments received during the NPA's comment period. As a result of comments received, the wording of the text of the MUTCD, summarized in the Final Rule, may be revised to reflect the scientific and qualitative data resulting from experimentation, research, and public comments received. Like the NPA, the

Public input is very important in the Federal Government's rulemaking process. The FHWA's mission is to provide proactive leadership, expertise, resources, and information to continually improve the quality of our nation's highway system and its intermodal connections.

Final Rule is also published in the Federal Register. The Administrative Procedure Act provides that agency rules may not be made effective until 30 days after publication in the Federal Register.

Title 23 of the Code of Federal Regulations, Section 655.603, indicates that two years after the Final Rule is published, the States must incorporate the change into the State's manual (if applicable) unless another compliance date is noted in the Final Rule. This means that public agencies shall be in substantial conformance with the change 2 years after the Final Rule is published. In some cases, for example, when the cost of doing so would be prohibitive, the FHWA may extend the compliance period to allow normal maintenance replacement of the traffic control device and time for

the jurisdiction to budget for the new traffic control devices. Take for example the recent proposal to add a retroreflective strip to the post of the Highway Rail Grade Crossing (Crossbuck) Sign (R-15-1, 15-2). In order to minimize any negative financial impact to State and local highway agencies, the FHWA is providing a 10-year phase-in period for existing installations.

Conclusion

Public input is very important in the Federal Government's rule-making process. The FHWA relies heavily on comments from State and local governments, individuals, industry, and private organizations when making important decisions about revising or adding new traffic control devices or applications to the MUTCD. The FHWA's mission is to provide proactive leadership, expertise, resources, and information to continually improve the quality of our nation's highway system and its intermodal connections. We undertake this mission in cooperation with all our partners to optimize the performance of our transportation system thereby enhancing the country's economic vitality and the public's quality of life. Accordingly, your input is very important and it is in everyone's best interest that you review relevant NPA's and offer your opinion. ▲

WST2 Center Partners with Insurance Corporation of British Columbia



*Dave
Sorensen,
WST2
Traffic
Technology
Engineer*

Recently Dave Sorensen and Roger Chappell of the WST2 Center traveled to Victoria B.C exploring a partnership opportunity with the Canadian Government as part of the Border Technology Exchange Program (BTEP).

The Insurance Corporation of British Columbia (ICBC) is a Canadian Provincial Government Agency, established in 1973 to provide universal auto insurance to BC motorists. For comparison, the ICBC would be similar to combining the Washington State Department of Licensing (auto/driver license division), an auto insurance company, and the Washington Traffic Safety Commission. ICBC has five primary lines of business: Driver Services, Auto Plan Services, Road Safety Services, Commercial Vehicle Services, and Claim Services.

Their mission statement is "to help British Columbians take the risk out of road transportation." ICBC is fully engaged in reducing crashes and the large costs asso-

ciated with the crashes. ICBC invests in road safety because it makes good business sense. By working hard to prevent crashes, they reduce claims costs, which help reduce insurance premiums.

Recently ICBC launched a "Safer Cities" program for British Columbia local agencies. The Safer Cities program was modeled after a highly successful pilot project developed and put into practice in the City of Gloucester, United Kingdom. The first city in British Columbia to implement this program was Kamloops. Safer Cities is very similar to the Local Agency Safety Management System (LASMS) program Dave Sorensen manages at the WST2 Center. Currently Dave is assisting the city of Vancouver, Washington with implementation of the LASMS.

Discovering a Canadian parallel program, Dave met with Kelvin Roberts, ICBC Safer Cities Project Manager, to compare Safer Cities and LASMS implementation strategies and experiences. Kelvin demonstrated a GIS (Geographic Information System) based collision analysis software program ICBC is currently developing for the Safer Cities program. Bearing in mind the current U.S./Canadian currency exchange rate, WST2 Center is considering a partnership with ICBC to share development costs of the software program.

"This is great opportunity to exchange technology and resources at the benefit of local agencies on both sides of the border", Kelvin said. Collaborative efforts such as this epitomize the mission of the WST2 Center.

The WST2 Center recently received a grant from the Washington Traffic Safety Commission to develop a collision analysis software system for Local Agencies as a tool for the LASMS.

The real advantage of a partnership with ICBC is simple; by exchanging resources, technology, information, and experience both Governments benefit. If implemented, the partnership focus would be on completing the GIS based crash analysis system ICBC is currently developing for the Safer Cities project. With some modifications, it would be possible for the WST2 Center to package the software as a companion tool for the LASMS at a far lower cost than developing a similar system from scratch.

A reciprocal agreement between ICBC and the WST2 Center could be executed allowing each agency the rights to the software. Next generation program modifications would be shared allowing the flexibility of a more responsive software system for local agencies as their program needs change. ▲

Riding In the Cargo Area of Pickup Trucks: Increased Risk of Injury and Death

Reprinted from Traffic Research & Data Center Research Notes, WTSC, January 2001

- Occupants riding in the cargo area were 9 times more likely to die in collisions.
- They were 3.6 times more likely to sustain serious injuries in crashes.
- 74% of cargo area occupants killed or injured were children under the age of 18.

National research studies show that riding in the back of pickup trucks increases the risk of ejection in a collision, which often results in serious or fatal injuries (Hamar, et. al., 1990; Woodward, et. al., 1990; McHugh, 1999; Agran, et. al., 2000; Anderson, et. al., 2000). The American Academy of Pediatrics (2000) reported that cargo area enclosures, such as camper shells, provide only limited protection to occupants riding in the truck bed and are associated with increased risk of carbon monoxide poisoning. The research also shows that many of the deaths among occupants in pickup truck beds occurred as a result of non-crash events (e.g., evasive maneuvers such as sudden braking or swerving). Furthermore, young passengers were over-represented in fatalities in these types of collisions, accounting for about one-half of deaths to truck bed occupants.

Analyses of Washington State data on truck bed occupants in collisions corroborate the findings of research studies nationwide. In 1996 in Washington, 168 persons were involved in 96 collisions while riding outside of the truck passenger compartment.

Table 1: Pickup Truck Passengers Involved in Collisions, Washington, 1996

By Passenger Seating Position and Ejection Status • Source: WSP

Passenger Seating Position	Ejection Status			Total	% Ejected
	Not Ejected	Ejected	Unknown		
Outside of Pickup Trucks	99	39	30	168	23.2%
Inside of Pickup Trucks	24,342	181	1,051	25,574	0.7%
Unknown	2,042	51	507	2,601	2.0%
Total	26,484	271	1,588	28,343	1.0%

Table 2: 1996 Collisions Involving Occupants in Truck Beds

By Primary Collision Types • Source: WSP

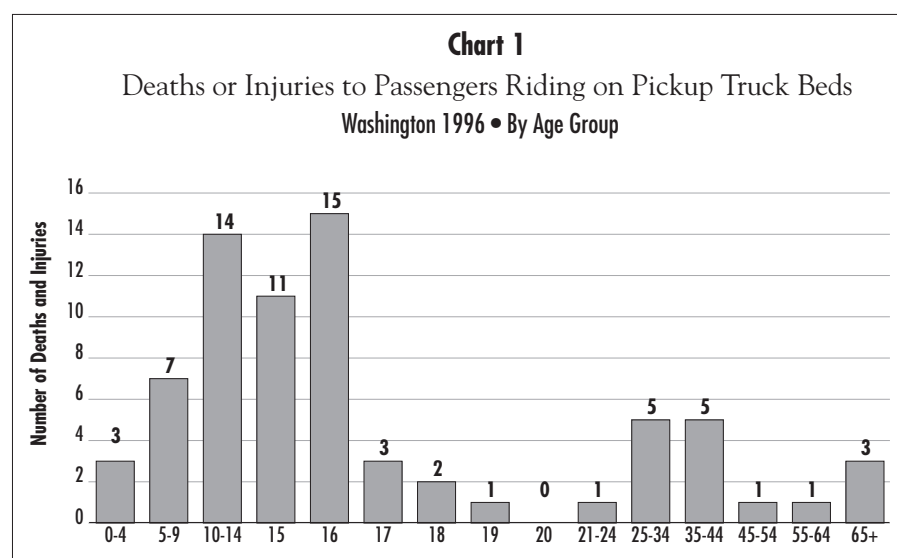
Single Vehicle Collisions		Total	% Sub Total
Evasive maneuvers		25	55.6%
With fixed objects		18	40.0%
Pedestrian collision		2	4.4%
Sub Total		45	100.0%
Multiple Vehicle Collisions			
Rear end		30	29.4%
T-bone		20	19.6%
Driveway access		18	17.6%
With parked vehicle		8	7.8%
From parked position		6	5.9%
Head-on		6	5.9%
Side wipe		4	3.9%
Opposite direction left-straight		4	3.9%
Opposite direction others		4	3.9%
Same direction others		2	2.0%
Sub Total		102	100.0%
Total		147	—

Table 3: Washington Pickup Truck Collisions By Seat Position

By Seating Location and Injury Severity • Source: WSP • Prepared by Washington Traffic Safety Commission

	No Inj	Fatal Inj	Serious Inj	Evident Inj	Possible Inj	Total	% Injured	% Killed
Outside of vehicle	90	3	11	37	27	168	44.6%	1.8%
Inside of vehicle	19,248	40	428	2,168	3,678	25,562	24.5%	0.2%
Unknown	2,000	5	29	171	321	2,526	20.6%	0.2%
Total	21,338	48	468	2,376	4,026	28,256	24.3%	0.2%

Frequency Missing (due to missing seating position and/or injury levels) = 818



Risk of Ejection

Of the 168 passengers riding in pickup truck beds, 23% were ejected in the collisions. Compared with the proportion of passengers inside the cab who were ejected (0.7%), the risk of ejection to the cargo bed occupants was 33 times greater. (See Table 1.)

Collision Types

About a third of the truck-bed occupants were involved in single vehicle collisions, while the remaining collisions involved other vehicles. Fifty-six percent of the single vehicle cases occurred as a result of evasive maneuvers (See Table 2). When other vehicles were involved, rear-end collisions were the most frequent (29%), followed by side impact (T-bone) collisions (20%).

Collision Locations

National studies found that rural roads were the most frequent locations for pickup truck collisions where passengers rode in the cargo areas. In Washington, according to 1996 data, city, state, and county roads were roughly equivalent in the percentage of these collisions (34%, 33%, and 29%, respectively). In contrast to national figures, urban areas in Washington had a higher percentage of this type of collision (70% in urban versus 30% in rural areas)

Fatal and Serious Injuries

Washington data show that the risk of injury or death was greatest among the occupants riding in pickup truck beds (See Table 3). While only 25% of the occupants inside the cab were injured, 45% of those riding in the pickup truck bed were injured. Cargo area occupants received serious injuries 3.6 times more often than cab occupants (6.5% vs. 1.8%). The risk of a fatal injury was nine times greater (1.8% vs. 0.2%) for the occupants in truck beds compared to those inside the cab.

Children and Youth at Risk

Children and teenagers were over-represented in the deaths and injuries among those riding in pickup truck beds (See Chart 1). Seventy-four percent (53 children) of those who were killed/injured were under the age of 18.

The Fatality Analysis Reporting System (FARS) is a national database of fatal traffic collisions. During the past 7 years (1993-1999) nationwide, there were a total of 1,191 persons killed while riding in the bed of pickup trucks. Children under the age of 18 accounted for 38% of the deaths. In Washington State, during the same period, there were 22 deaths and 68% (15) were children under age 18. The proportion of child deaths in Washington exceeded the national figure. ▲

Pavement Warranties: A Developing Trend

By Bob Brooks

The trend over the last several years nationwide, and indeed internationally, has been towards greater accountability of resources used by public agencies. Typically specifications that contractors must meet are placed on materials and workmanship and this goes a long way towards assuring a quality product. However, these specifications do not address the important question of how the final product will perform over time. One method to address the long-term performance issue is through the use of performance specifications.

Performance specifications, unlike material and workmanship specifications, address the issue of product performance over time. Until the early 1990's performance specifications were used in a very limited way or not at all. In fact, the structure that the FHWA and the states operated under precluded the extended use of performance specifications. This has changed and the FHWA is now a supporter of the use of these specifications in contracting. Performance specifications have been in use in Europe for many years and several states have been using them since the mid 1990's with favorable results. Performance specifications are simply an assurance on the part of the contractor that the warranted item performs in a manner that has been pre-determined and agreed to in advance by all the parties to the contract.

Several contract items lend themselves to the use of performance specifications; landscaping, bridge painting, pavement striping, and of course paving. Regardless of the work item covered, the establishment of performance specifications and their implementation can be approached in the same manner.

Several contract items lend themselves to the use of performance specifications; landscaping, bridge painting, pavement striping, and of course paving. Regardless of the work item covered, the establishment of performance specifications and their implementation can be approached in the same manner. This article will concentrate on the use of performance specifications for asphalt pavement.

Anatomy Of A Performance Specification

There is no "one-size-fits-all" when it comes to the development of performance specifications. In fact, their use to date shows that these have to be constructed in a way that meet the individual needs and concerns of the organization and parties involved. There is, however, a generic structure that any performance specification should have to ensure its effectiveness. The following are elements desirable to any performance specification:

- 1) Acceptance Criteria - this should be furnished by the contractor to the contract owner as a part of the bid process and should include a quality control plan and a certification process for the materials used on the project. This can address the certification of the contractor's testers, mix design methods, sampling methods, plant operations, lay down operations, density specifications, and the documentation process.
- 2) Performance Criteria - this should include the engineering properties to be used to evaluate the performance of the pavement, such as rutting, cracking, smoothness, skid resistance, etc. and the procedures for evaluating those properties. Also included would be the length of time

that the contractor would warrant the pavement performance. Many different warranty periods have been tried by various states, ranging from 2 years to 20, with the typical period being around 5 years. It has been established that periods much greater than 5 years tend to contribute to nervousness on the part of the contractors and the bonding industry and a reluctance to bid. Also established are the mitigation procedures to be applied by the contractor in the event of a failure of one or more of the performance criteria.

- 3) Evaluation Process - this is how the measurement of performance criteria will be accomplished and how often, example: yearly testing of the project pavement for the performance criteria by the contract owner (state, county, etc.) using a specified manner and provided to the contractor.
- 4) Dispute Resolution - this is a pre-defined process for the parties to get together and settle any disputes that occur during the construction process, the warranty process, or its mitigation. This usually involves the establishment of a conflict resolution team with equal representation from the contractor, the contract owner, and a neutral third party. All parties agree to abide by the decisions made by this resolution team. Interestingly enough, the experience of other states has been that

...the contractor is only expected to be responsible for those elements that he can control.

of very little need for the resolution process with most disputes resolved in a cooperative manner.

One of the underling principals of establishing successful performance specifications is that the contractor is only expected to be responsible for those elements that he can control. To expect otherwise will doom the warranty process to failure. The most critical aspect in establishing performance specifications is to get all the parties together early on in the establishment process. This should include the contract owner, contractor organizations, the bonding industry, and any other parties that have a significant stake in the process. As might be expected anytime a substantial change in the contracting process is proposed, you can expect there will be initial resistance to the proposal. However, the experience of other states has shown that once the parties become comfortable with the process, many if not all of those concerns become non-issues.

Benefits To Be Gained

There are many benefits to be gained from performance specifications. Following are some of the expected benefits for both the contractor and the contract owner.

- 1) Defines Success - by pre-defining performance criteria and monitoring the performance of the pavement over time, it becomes very easy to know when a successful product has been achieved. This applies equally to both the contractor and the contract owner.
- 2) Balanced Risk - this simply allocates the risk and responsibility for the contract elements to the party that has control over those elements. An example would be having the contractor responsible for the construction techniques and sequences used to accomplish the work. This can contribute to an environment of innovation and increased efficiency.
- 3) Innovation Rewarded - placing the responsibility for the long-term performance of the pavement with the contractor and allowing him the ability to control many aspects of the construction process contributes to innovation, increased quality, and greater potential reward for the contractor.

- 4) Non-confrontational Construction - by having a well defined and agreed to procedure for sharing responsibility and resolving conflict, the relationship between the parties is transformed from confrontation to one of cooperation and trust between the partners.
- 5) Improved Quality - by allowing the contractor more control over the construction process and placing the responsibility for the long-term performance of the pavement with the contractor, a better quality, better performing pavement has been the result. The motoring public is the ultimate winner in this process with improved satisfaction with the final product and reduced operating costs.

The warranty process offers the contractor the opportunity for flexibility and innovation and the potential for greater reward. The contract owner benefits from the reduced need for personnel such as inspectors on projects — an important consideration in these times of reduced resources and lost expertise — less need for early pavement maintenance, and a better performing pavement. The public gains with a greater satisfaction from a better performing, smoother, and safer pavement.

It's also been found that the innovative techniques and procedures developed on the warranty projects also carry over to the non-warranty projects and thus contribute to improved performance and reduced construction costs for these projects as well.

Contract Structure And Cost

One method of structuring a warranty contract that has proven successful in other states is the A + B + C method. The contract is awarded to the overall lowest bidder based on a combination of three elements.

- A. Unit Prices - as in a conventional contract the contractor supplies his per/unit price for all the materials specified in the contract documents. The extension of these per/unit prices constitutes the first or A element of the bid.
- B. Time Costs - this is the element in which the contractor can really become innovative. The contract owner establishes a cost basis for peak commute and non-peak commute lane closure times and the contractor then analyzes the work required and his approach to accomplishing that work and specifies the number of peak and non-peak closures he will require to complete the project. The contractor (if awarded the bid) is then paid for the number and type of closures specified in the bid. If the project can be completed with fewer closures than specified then that becomes an additional source of profit to the contractor.
- C. Warranty Cost - this can be specified as a separate bidding element if desired and the contractor would then bid an amount that might cover his costs if he were required to perform any warranty repairs during the warranty period. If no warranty repairs are required then this also could become an additional source of profit for the contractor. Some states have chosen not to include this as a separate bidding element.

While there are several opportunities for the contractor to reap additional profit from these contracts, keep in mind that the contractor is responsible for the performance of the project pavement for the specified period of time in the warranty. This could require him to take mitigation measures up to and including removal and replacement of a failed pavement at the contractor's expense. The contractor deserves to be compensated for this additional risk that he assumes. As with any other project, the contract is awarded to the lowest bidder. This fact acts as a mechanism to keep the potential for additional profits at a reasonable level for the work and risk involved. The experience to date shows that the typical increase in costs for these warranty contracts is running an additional 2 to 5 percent with initial contracts running higher and then costs decreasing as the industry becomes more comfortable with the process.

Warranty contracts are not suitable for every project. They have primarily been used for paving contracts on the arterial system. They do require additional time to prepare and certain types of work are not well suited to the process. Not all contractors are willing to participate in these contracts and they tend to tie up a contractors bonding potential for extended time periods. For these reasons, it may be best to limit the number of contracts to an amount that is sustainable to the industry. However, experience has shown that they can yield a superior performing pavement with reduced costs to the contract owner and they do place a greater emphasis on customer (public) satisfaction. Considering the potential benefits and flexibility of these warranty contracts, they can be a win-win situation for all involved. ▲

Comprehensive Land Cover Mapping in King County

Capitalizing on the Strengths of High & Low Resolution Multi-Spectral Imagery

By Marshall and Associates, Inc.

The number of high-resolution, multi-spectral sensors in service is growing every year in both airborne and satellite venues. Consequently, this type of imagery is becoming more affordable.

"High-resolution multi-spectral imagery is a popular product because it can serve two purposes: as a detailed image backdrop for visualization with other GIS themes; and as an effective means of land cover mapping or updating through spectral analysis." says Marshall and Associates Remote Sensing Team Lead, Kristin Gerhart. "However," she adds, "high-resolution imagery also presents several challenges in successful spectral classification. Methods for overcoming these challenges lie in integrating low-resolution satellite imagery where appropriate, as well as reliable ancillary themes such as elevation data, hydrography, soils, etc."

MARSHALL's work on the King County Land Cover Classification project exemplifies this type of integration.

"high-resolution imagery also presents several challenges in successful spectral classification. Methods for overcoming these challenges lie in integrating low-resolution satellite imagery where appropriate, as well as reliable ancillary themes such as elevation data, hydrography, soils, etc."

The MARSHALL team, led by Gerhart and including Project Advisor Dr. John Colwell and Process Design Expert Norm Roller, pioneers in the field of remote sensing, has been contracted to produce a set of land cover themes for King County using multi-spectral imagery sources.

The challenges faced in the King County project fall into three areas:

Diverse Land Cover

This large county encompasses a variety of terrain and land cover types, including intensely urbanized, metropolitan regions; suburban and rural areas; farmland; managed and non-managed forests; open water; and alpine environments.

Physiography

The range of disparate land cover classes is further complicated by effects of terrain change and high latitude. Slope, aspect, shadows, cloud cover, and haze all affect the consistent spectral response of land cover classes.

Imagery Characteristics

The imagery data sets specified for use in the project vary in spatial and spectral resolution, radiometric resolution and quality, and acquisition date. These characteristics make for a challenging project requiring significant development in imagery assessment, classification, and methodology for integration of thematic results.

There are 10 land cover types to be identified in this project. Of primary importance is Impervious Surfaces. The Impervious theme is critical to identifying quality and quantity of runoff water in watersheds or other areas of interest, particularly near streams and water bodies.

The remaining pervious/vegetated classes to be identified in this project include:

- Non-constructed Bare
- Open Water
- Wet Areas
- Coniferous Canopy
- Deciduous Canopy
- Recent Clearcuts
- Herbaceous
- Shrub
- Young Conifer Plantation

Where necessary, an "Unclassified" category may be used for snow, clouds, and certain cloud shadows.

The designation "Wet Areas" is used as opposed to "Wetlands", as the County specified that all wet or boggy areas be mapped regardless of any official federal or state definition.

This class will be produced as a stand-alone theme separate from the other land cover types. Vegetated wet areas will receive a dual classification; being identified in the comprehensive land cover product as Herbaceous, Shrub,

"Results so far indicate that the high-priority Impervious Surfaces data theme can be developed to County specifications," reports Gerhart and "[although] the classification accuracy figures for the nine other land cover types are somewhat mixed, MARSHALL is working with the County to integrate other imagery and data sources to supply a dependable product."

etc. The designated Wet Areas can be used to cue planners and engineers to investigate the location of new developments and other land disturbances. Forested cover types will be used by resource planners in managing current assets, and will also facilitate future change detection efforts.

To most effectively meet classification cover types and map unit specifications, the MARSHALL team is using imagery data sets acquired by two airborne sensors:

- Kodak DCS460CIR
- Digital Airborne Imagery System (DAIS)

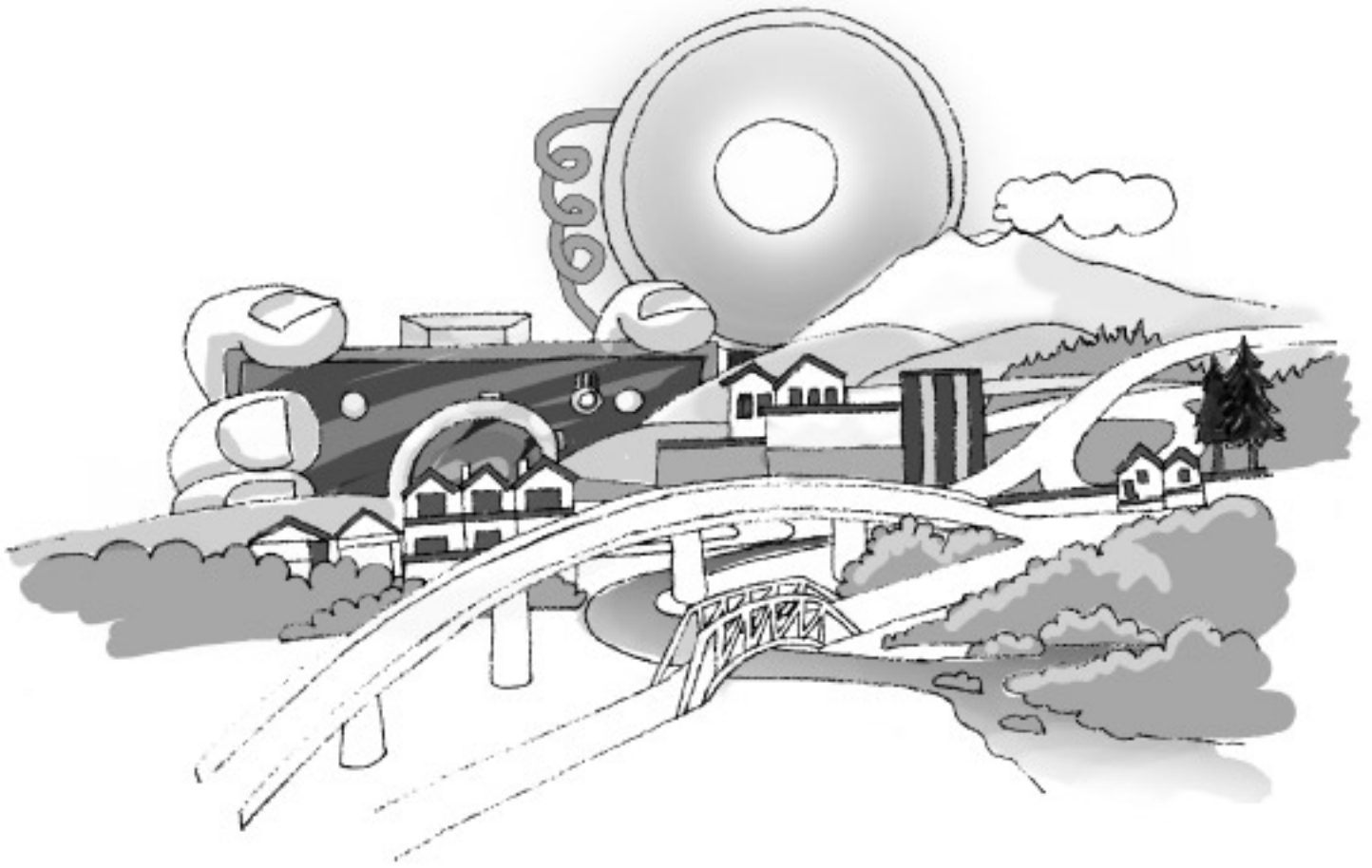
and three satellite sensors:

- IKONOS
- Landsat 5 TM
- Landsat 7 ETM

The Kodak, DAIS, and IKONOS sensors can be considered high-resolution, with pixel size ranging from 0.5 - 4m². The Kodak CIR airborne sensor is operated by the Emerge Corporation who delivered 830 mosaicked tiles to the County at a 2 ft² resolution with 3 spectral bands. The Emerge data were collected over the western half of King County. The DAIS sensor, operated by Space Imaging Inc. captured imagery at 0.5 m² resolution for Vashon Island only. The eastern half of King County, being primarily rural and forested, is covered by the IKONOS satellite sensor to lower costs.

The Landsat 5 and 7 TM sensors are in the low-resolution class (25m² in the spectral bands). Landsat applications include land cover mapping and change detection for: vegetation type and health, soil moisture, snow cover, and fire mapping. Scenes from January and July 2000 were acquired by the Landsat sensor for the first phase of the project. The winter scene will help to differentiate the wet areas, deciduous vs. evergreen tree canopy, and shrub/scrub areas.

The project commenced in November with a thorough assessment of the highest resolution data set (Kodak CIR sensor) supplied by the Emerge Corporation. "Results so far indicate that the high-priority Impervious Surfaces data theme can be developed to County specifications," reports Gerhart and "[although] the classification accuracy figures for the nine other land cover types are somewhat mixed, MARSHALL is working with the County to integrate other imagery and data sources to supply a dependable product."



At this point, the Emerge data pilot has been completed and the IKONOS and Landsat pilot projects are underway. Pilot testing areas were selected to evaluate the ability of the imagery sets to map a complete variety of features and to assess integration overlapping issues.

The four imagery type assessments guide the analysis design and testing methods. Image properties also affect the classification accuracy of final products. For example, spectral characteristics of the Emerge data set were found (as expected) to limit the data set's ability to differentiate the specified categories. Currently, an Emerge data redelivery is being considered to

take advantage of a different post-processing algorithm applied by that company.

Given the results of the Emerge data pilot, the MARSHALL team decided that in Phase I, only the Impervious class would be extracted from the three high-resolution data sets. The Landsat images' classification will deliver the Pervious classes, Wet Areas, and will include an Impervious class at that lower resolution.

Phase II of the King County Land Cover Classification Project has not been completely defined, pending results from Phase I. However, it is anticipated that a change detection effort using mid-late '90s Landsat

imagery will be an important component. The County has expressed an interest in establishing a change detection program at three to five year intervals using Landsat imagery to cue the acquisition of high-resolution images. Another option is to refine products from Phase I using ancillary GIS themes (not yet completed). Further analysis of the IKONOS data set may indicate a need for additional imagery acquisition to cover the western portion of the County. ▲

Ride Quality Specification Contracting



*Bob Brooks,
Pavement
Technology
Engineer*

Derived from an article in the January/February 2002 Public Roads magazine, It's the Ride that Counts by Rick Boeger and Roberta J. Crowe

Ask the public what they perceive to be important in a quality road system and the one concern mentioned more often than any other is ride quality. The importance placed on this one aspect of the commuting experience, by the public, goes a long way in determining the satisfaction level with the road system and the work of the organization maintaining that system. For that reason alone, ride quality should be of concern to the pavement manager.

A unique approach to dealing with this issue has been implemented by the Maricopa County Department of Transportation in Arizona. The program they put in place allows the contractor on roadway paving projects to be responsible for the smoothness of the finished pavement. On newly constructed roads or overlay projects, the smoother the ride the more money the contractor can take to the bank. Under the incentive program, the

contractor can earn as much as an additional 10 percent of total project paving costs by exceeding the preset standard for smoothness. Conversely, if the contractor fails to meet the standard they can be penalized as well.

Somewhat surprisingly, the contractors in Maricopa County have enthusiastically embraced this approach as a "win-win" scenario. The county receives a superior quality pavement requiring less maintenance and receiving fewer complaints. The contractor has the opportunity to earn additional profit. The public wins in several ways; with a smoother and quieter ride, less wear and tear and therefore less maintenance on their vehicles, and as taxpayers with reduced maintenance costs.

Encouraged by their ability to increase the profit margin, the paving contractors strive to maximize the elements under their control by maintaining the optimal asphalt mix temperature and consistency; use a steady, non-stop paving process; have a consistent methodology; make appropriate on site equipment modifications; execute well-planned roller strategies; and use profilometers to measure results.

The International Roughness Index (IRI) is used to measure the pavement roughness after the completion of the final course and this value is then used to adjust the contractors paving costs based on the "Adjustment for Rideability" chart (table 1). Prior to the placement of the wearing course, a preliminary reading is taken on the paving material placed to date and this helps the contractor to make adjustments prior to laying the final course.

The IRI represents the vertical (up and down) displacement a passenger vehicle would experience while traveling at the posted speed limit. The final pavement surface is evaluated for smoothness using a test vehicle with a laser-operated measuring device mounted to the frame. A beam of light measures the precise distance between the instrument and the pavement surface at preset and equal intervals over the pavement profile. The recorded data are compiled and averaged to obtain the IRI score. A zero value would indicate a perfectly smooth pavement surface, with increasing IRI values corresponding to an increasingly rough pavement surface.



Table 1
Adjustment for Rideability

IRI (inches per mile)	Percent Adjustment
< 50	+10
51 - 60	+5
61 - 80	0
81 - 100	-5
101 - 110	-10
111 - 120	-25
>120	Requires Replacement

Payment to the contractor shall be based on the IRI according to this table. The percent adjustment will be applied to payment(s) for the total quantity of hot-mix asphalt used in travel lanes only upon completion of the final course of pavement.

Based upon the experiences of Maricopa County in implementing its Smoothness Specification Program, asphalt rubber pavement has consistently emerged as superior in smoothness and has the added benefit of reduced road noise as compared to conventional mixes. Asphalt rubber overlays have been so successful that the county is now considering the use of a one-inch asphalt rubber surface on all new roadway construction. A recent overlay project of 17 miles of Maricopa Road resulted in an average IRI after the overlay of 54 inches per mile and is considered a huge success. The Maricopa Road project had an estimated cost of \$1,965,119 and the total paid incentive was \$77,217. Everyone walked away from this project happy: the contractor received an incentive payment; the county received a superior product requiring less maintenance; and the public got what it wanted most — a smoother pavement. ▲



Introducing the Pavement Technology CD Library:

The WST2 Center is pleased to offer a new format for the distribution of pavement related technical manuals and accumulated WST2 Newsletters. The documents listed below are available on CD in PDF format and all that is needed to view or print these documents is a web browser and Acrobat Reader. The CD will be available on an ongoing basis and will be updated with new technical manuals (I've included the Minnesota Seal Coat Handbook from the Spring Conference) and newsletters as they become available in electronic format. Several times a year an updated version will be made available through the WST2 Center.

If you are interested in receiving a free copy of the CD Library, just send me an e-mail with your name and mailing address and we'll get a copy right out to you.
BrookBo@wsdot.wa.gov

CD Table of Contents

1. A Guide for Local Agency Pavement Managers
2. Gravel Roads Maintenance and Design Manual
3. Local Agency Pavement Management Application Guide
4. Minnesota Seal Coat Handbook
5. Pavement Surface Condition Field Rating Manual for Asphalt Pavements
6. Rockfall Catchment Area Design Guide
7. WSDOT Standard Specifications: 2002 (English)
8. StreetWise — A Simplified Local Agency Pavement Management System
9. WST2 Newsletters — 1992 - 2001

WSDOT's Aberdeen Maintenance Shop's Chip Seal Hitch

By Wendy Schmidt, WST2
Assistant Editor

Well, isn't this just the way things go? You get a system down and things are running smoothly, then something changes and you are back to square one. That's what happened at the WSDOT Olympic Region shop in Aberdeen. They had been using hitches built by equipment mechanic Jerry Shields on all of their dump trucks that enabled their chip seal operation to proceed swiftly. Then about a year ago, they purchased new trucks and acquired a different chip spreader box. Some of the old hitches were welded to their older trucks, so when the trucks went, so did the hitches. The remaining hitches didn't fit the new trucks. The hitches were handy because they allowed the chip spreader to latch onto a bar on the back of the truck for quick grab and release. Don Wright, Lead Tech, crawled around under the new trucks looking for a place to attach a chip spreader hitch onto their new trucks. The trucks were a little different from each other, and Don noticed the only thing that was the same on all of them was the pintle hitch mount, or coupler,

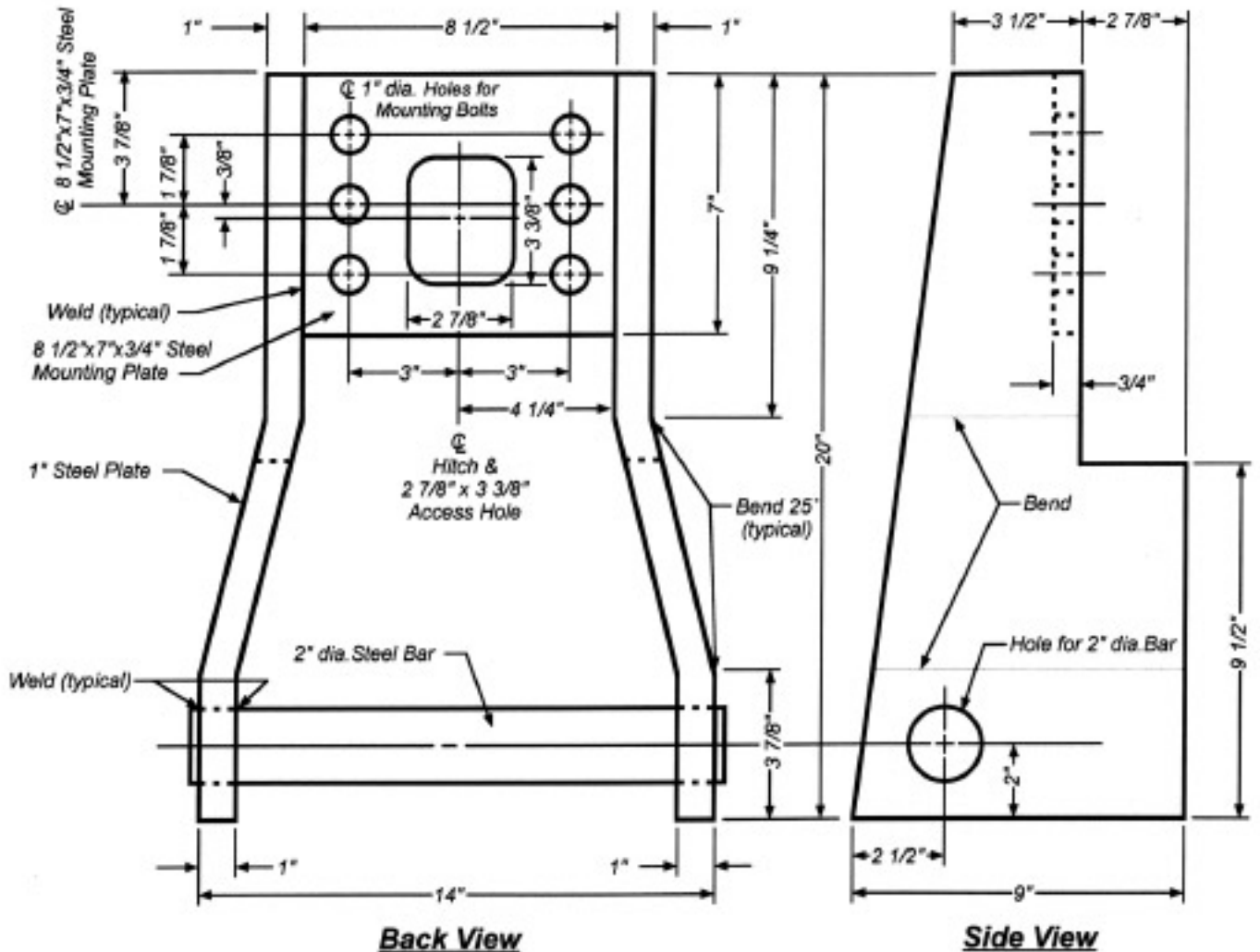
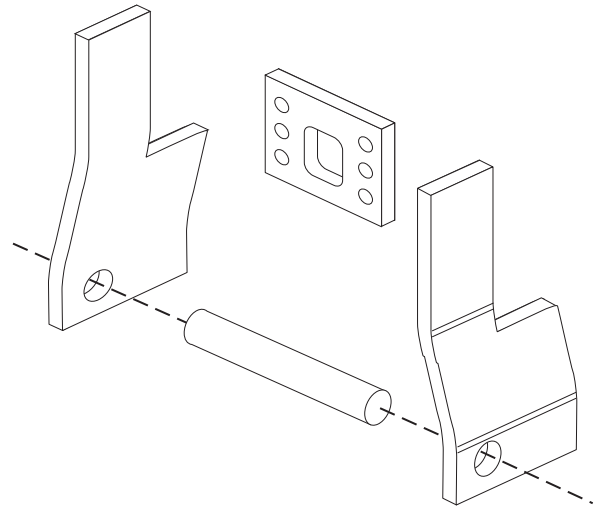
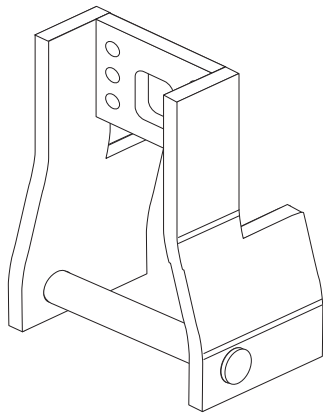
bolted to the rear bulkhead. He came up with the idea of making the hitch so a back plate could be sandwiched between the coupler and the bulkhead and bolted on.

Don sketched a hitch resembling a manufactured one he had seen, modified it so it would work with their spreader box, and took it to a local machine shop. The shop fabricated one, but Don and his co-workers found they had to modify it because the hitch bar on some trucks was too far under the truck. When the spreader box fastened onto the hitch, it was set too close to the truck, so they didn't turn around a curve very well together. Don and his co-workers also discovered that some of the holes drilled through the back plate didn't quite match up with the holes through the coupler plate and the rear bulkhead on the trucks. To solve that, they drilled the holes a little larger. It was also necessary to extend the length of the coupling thimble between the air can and the coupling by the thickness of the back plate on their new hitch, $\frac{3}{4}$ inch. They discovered if they installed a 3 1/2 inch long thimble in place of standard 2 3/4" standard thimble, everything worked OK. They used 3/4" diameter bolts

to fasten both the coupler and the spreader box hitch to the rear bulkhead of each truck. The holes were slightly oversized to 1-inch diameter to allow proper alignment of all three components.

Once they had a working design, they made more. Jerry Shields and Don Soto, also an Equipment Mechanic1 at the WSDOT Aberdeen Equipment Shop, modified and mounted seven new hitches on their trucks, all with encouragement from Les Nevitt, Equipment Mechanic 2, their Supervisor. Ron Bashon, Area 4 Maintenance Superintendent, and Jim Green, Olympic Region Equipment Superintendent, both supported the construction of the new devices as tools that would make their district's chip seal operations run smoother, faster, and safer. With these hitches, trucks can "hook on the fly" so the chip spreader box doesn't have to stop when one truck dismounts and the next truck backs in and hooks up.

For more information, you can contact the WSDOT Aberdeen Maintenance Office by telephone at (360) 533-9356. ▲



NOTE: Adjust the dimensions of the mounting bolt and access holes to fit the coupler being used. Hole dimensions and locations shown are for a Model 370 Coupling from Premier Manufacturing Co.. Also, the coupler "Thimble" will need to be replaced with one 3/4" longer than the original to account for the thickness of the mounting plate.

The Bobcat Grinder Asphalt Screed

*By Roger Chappell, WST2
Technology Integration Engineer,
WST2 Center*

How do you get smoother asphalt without spending a lot of time and money? Well, if you're Brian Gibb, Jeff Jackson, Jim Simmons and six other members of the WSDOT Kelso Maintenance Crew, you develop and build the Asphalt Screed.

By using the screed, they are able to complete the same job in half the time and save money in the process. Before the asphalt screed, you either had to hand rake or use a grader to spread the asphalt after a grinding operation. Hand raking was time and labor intensive and using a blade was expensive; neither was very consistent. The asphalt screed eliminates the need for a grader and operator or two people manually raking the asphalt. By using this new tool, the Kelso Maintenance Crew has found a net savings of approximately \$415 for a 10-hour day.

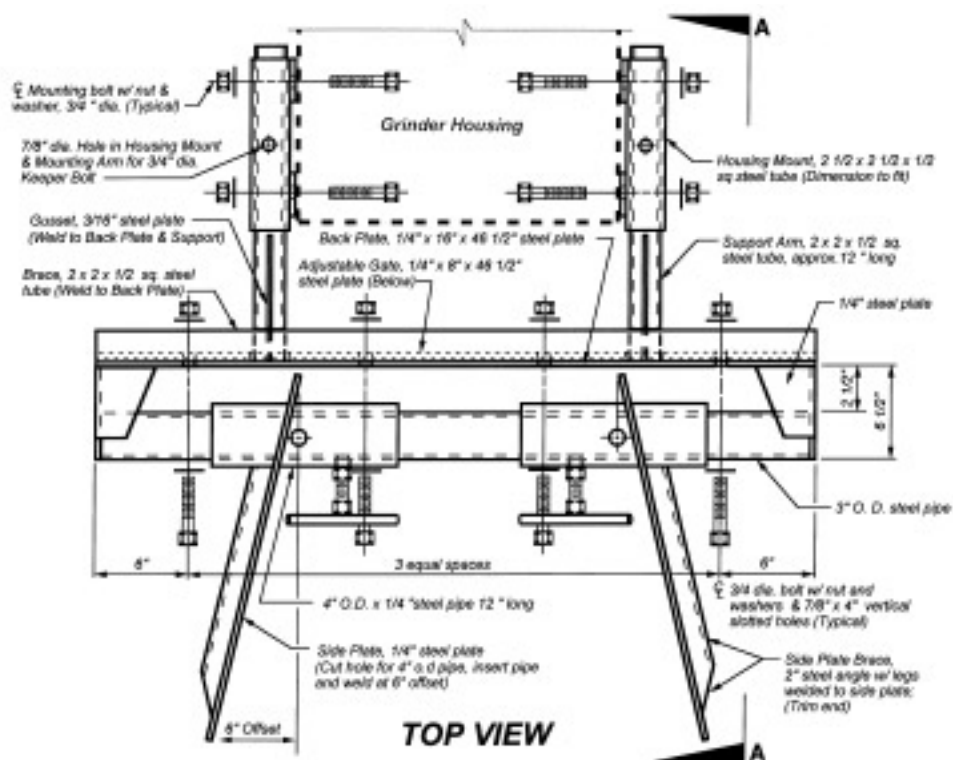
You are probably wondering what it costs to build an asphalt screed? The prototype unit cost approximately \$500 to develop. The Crew is now able to build one for approximately \$300, depending on the availability of recyclable materials. The welding and fabrication was done in-house. As with most inventions, developing



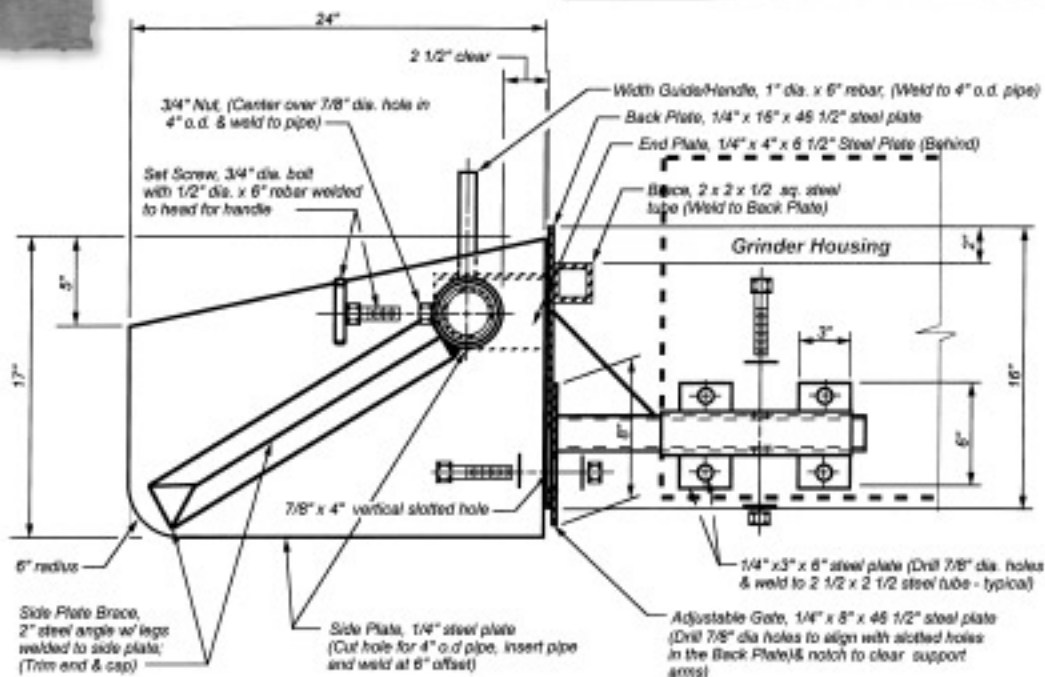
and building the asphalt screed has been an evolutionary process. Incremental improvements continue to be made as crews find ways to adapt the tool to meet various needs. Using the handles on top of the asphalt screed for sighting, size, angle of the blades, and bracing has all gone through this evolutionary process.

How does it work? The asphalt screed was designed so that the adjustable mounts are bolted onto the asphalt grinder housing. Mountings are designed in such a way as to keep the screed up and out of the way during grinding

operations. After grinding operation is complete, asphalt is placed in the trench. The grinder is then tilted forward lowering the screed to the pavement. As the screed moves forward, it is designed to gather the asphalt to the center, leaving the edges clean, and the height is set so it is ready for rolling. A simple yet effective solution to an expensive labor-intensive process. ▲



Note: Mount the unit onto the Grinder Housing so that the Grinder Head doesn't contact the new asphalt during screeding operations.



Colville 2000 Project Receives National Recognition

The Colville 2000 Downtown Revitalization and Transportation Improvements Phase 1 project received the 2001 National Partnership for Highway Quality (NPHQ) National Achievement Award. The project won the 2001 Partnerships for Quality Transportation (PQT) Achievement Award, and was then forwarded as a nomination to the NPHQ National Achievement Award.

The new Wynne Street arterial relieves capacity on U.S. 395, which is also Main Street through Colville. Innovative elements of the project include traffic calming design features, plus the cooperative connection between local economic development and regional transportation goals. Bob Templeton, NPHQ Administrator, stated that the Colville 2000 project "was indeed a quality project and raised the standard for doing highway work, not only in Washington, but across the United States." ▲



Partners for Efficiency

In a coordinated effort involving the Transportation Improvement Board (TIB) and Washington State Department of Transportation Highways and Local Programs Division (H&LP), a new process called De-TEA is being implemented. De-TEA transfers H&LP federal funds from TIB projects that have small amounts of federal funding and replaces the federal funds with state TIB funds. This process aims to relieve federal requirements from projects that are federally linked by virtue of the presence of federal funds only. The transfer is accomplished by reassigning the H&LP federal funds to larger TIB projects that already have federal links and can use the funds without increased costs.

The primary intent of De-TEA is to decrease administration costs to projects and increase project delivery. The federal requirements associated with utilizing federal funds can be burdensome and increase the administrative costs

For projects to be considered they must have both TIB and H&LP federal funding.

for smaller projects. Removing the federal financial ties will not only reduce administrative costs and allow faster progress toward construction, the larger projects should not notice any impact from the increase in federal funds.

For projects to be considered they must have both TIB and H&LP federal funding. Subsequently, the projects can not have federal links due to environmental permitting requirements, obligated the federal funds, or incurred project costs. Projects will be reviewed on a case-by-case basis by both H&LP

and TIB. Project prioritization will not be affected by implementing this process.

To date one funding swap is underway, swapping \$25,000 in H&LP federal funds on a City of Mansfield project with a like amount of TIB funds on a City of East Wenatchee project. Several other projects with dual funding are currently being reviewed and evaluated for the process.

For more information, contact Kathleen Davis, Acting Director, H&LP, at 360.705.7871 or davisk@wsdot.wa.gov or Stevan Gorester, Executive Director, TIB, at 360.705.7301 or steveg@tib.wa.gov.



2001 Award Winners

Partnership For Excellence In Contract Administration

by Dave Mariano, WSDOT Construction Office

Seven transportation projects received the 2001 Partnership for Excellence in Contract Administration Award. The award program is a joint effort between Washington Department of Transportation (WSDOT) and Associated General Contractors (AGC) of WA. A key element of the award program includes a partnered atmosphere with empowered project team members who are able to recognize and overcome obstacles, initiate effective public involvement, maintain effective communication between stakeholders, and streamline project administration where appropriate. The following projects were recognized for their extraordinary Contractor-WSDOT partnership responsible for delivering transportation projects in a timely, professional, and responsive manner while also considering the needs of customers and stakeholders who are impacted by the project:

**Honorable Mention
Western Washington Project
Less Than \$2 Million Winner:
SR 5, Interstate Bridge Decks**



Contractor: Concrete Barrier, Inc.; Project Manager: Concrete Barrier, Inc. & Project Team; Project Engineer: Fred Tharp & Project Team

The project provided for the improvement of SR 5 in Pierce County by repairing and protecting two bridge decks. The project included two new approach slabs, pavement seat and deck repair, hazardous material containment, a polymer surface removal, modified concrete overlay, and an asphalt overlay. The complete closure of the Bridgeport structure for not more than seven days proved to be the most challenging; however, time, scheduling, and cooperation were the key to a successful completion within those seven days.

**Honorable Mention
Western Washington Project
Greater Than \$2 Million
Winner: SR 5, SR 508
to Thurston County Line**



Contractor: Wildish Standard Paving; Project Manager: Scott Vogl and Ryan Elliot & Project Team; Project Engineer: Ron Pollock & Project Team

This project involved resurfacing the Northbound and Southbound lanes of Interstate 5 from MP 70.67 to MP 85.51. The project included paving mainline and interchange ramps, guardrail and drainage improvements, crack sealing, and pavement subsealing. The contract was awarded on May 2, 2000 and was physically completed January 5, 2001.

**Western Washington Project
Greater Than \$2 Million
Winner: SR 520, NE 40th St.
Interchange**



Contractor: Wilder Construction Company; Project Manager: Joe Spink & Team; Project Engineer: Jay LaVassar & Team;

The \$25 million dollar project provided improvements on SR 520 at the NE 40th Interchange by providing on and off ramps, constructing collector-distributor lanes, and adding a 1.46 mile paved bike path. The project also included constructing an underground detention vault, biofiltration swales, traffic signals at NE 40th St., and extending the IT system. The improvements completed at this interchange were a key part of several regional improvements by the city of Redmond and WSDOT to prepare for future expansion of the Microsoft campus. These regional improvements supported by the new 40th Street I/C include WSDOT's corridor widening projects along SR 520 from Lake Sammamish Parkway to Bellevue Way, the city of Redmond's expansion of NE 40th Street, and Sound Transit's plan to build a regional transit center at 156th Ave. NE, adjacent to the new interchange.

**Western Washington Project
Less Than \$2 Million Winner:
SR 5, NB Ravenna & N 103rd
Express Ramp Bridges**



Contractor: Concrete Barrier, Inc.; Project Manager: Concrete Barrier, Inc. & Project Team; Project Engineer: Bob Linden & Team

The project included bridge deck scarification, deck repair, overlay with a nominal 1-1/2" modified concrete overlay, and repair of 21 expansion joints. This overlay construction required the reduction of mainline I-5 from 4 to 2 lanes 24-hours a day. Other work included mainline shoulder reconstruction, and minor items of work for electrical and ITS improvements. The project contract provided 19 working days to complete the Bridge Deck Overlay; however, the contractor completed the overlay nearly five days early. The project team's efforts in minimizing the impact to traffic to downtown Seattle and communicating with the public were instrumental to the project's success.

**Eastern Washington Project
Greater Than 2 Million
Winner: SR 90, Sprague Ave.
to Argonne Rd., Stage 2**



Contractor: Max J. Kuney Company; Project Manager: Kevin Carrol, Gregg Edmonds & Project Team; Project Engineer: Bob Hilmes & Team

The project provided for the complete reconstruction of Interstate 90 between Broadway Ave. Interchange and Argonne Rd. Interchange. The project included removal of the twin bridges and construction of a new bridge that routed Park Rd. traffic over I-90. The project presented enormous challenges removing the existing roadway and lowering the profile grade vertically 25 feet. The new roadway was constructed under traffic through staging, detours, and temporary tunnels to minimize disruption and impacts to traffic.

**Eastern Washington Project
Less Than \$2 Million Winner:
SR 97, Lakeside Vicinity**



Contractor: Basin Paving Company; Project Manager: Basin Project Team; Project Engineer: Terry Berends & Team

The project is located in the City of Chelan along the shores of beautiful Lake Chelan and provided for the improvement of a ½ mile section of Highway 97A by widening to accommodate the addition of a two-way left turn lane to address a high accident location. Through a partnering effort between WSDOT, the City of Chelan, Link Transit, and Basin Paving Co. and their subcontractors, this project improved the safety and aesthetics along this section of roadway with very little impact to the local businesses and traveling public. With the project being located in a high tourism area, construction timing was very important to the local economy. Work began on March 19, 2001 and progressed very smoothly and was completed on May 24th. Several businesses and homeowners expressed their appreciation for getting this project completed prior to the Memorial Day weekend minimizing impacts to a critical tourism period.

**Statewide Special Mention
City/County or other Project
Administered By WSDOT/
Contractor Team Winner:
SR 509, Port of Tacoma
Grade Separation**



Contractor: Balfour Beatty Construction, Inc.; Project Manager: Scott Vion & Project Team; Project Engineer: Fred Tharp & Project Team

The successful partnership on this project was comprised of stakeholders including the Port of Tacoma, WSDOT, and Balfour Beatty Construction, Inc. Items of work included grading, embankment construction at bridge abutments utilizing the unique technology of lightweight geo-foam fill, drainage facility improvements, pile driving, a pre-stressed concrete girder bridge, two reinforced concrete box girder bridges, geo-synthetic ("Hilfiker") retaining walls and prefabricated and cast-in-place concrete fascia walls. Upon completion of this multi-modal improvement project, traffic, including passenger vehicle and truck and rail freight loads, moved more freely in and out of this busy commercial area without conflicting with traffic on SR 509.



Bringing Together Multimodal Transportation

Transportation Improvement Board (TIB)

The Everett Station is the new focal point for multimodal transportation in Everett. With facilities to serve Everett Transit, Community Transit, Sound Transit bus and commuter rail services and Amtrak, Everett Station is the culmination of years of coordinated efforts by many agencies.

The Everett Station will serve as a transportation hub, making connections easier for commuters, tour buses, shuttles, taxis, carpools and bicycles. The station also includes an on-site park & ride, and university level education classes and career development services will be provided at the station.

The project was constructed as a consolidated station building to accommodate various modes of transportation including intercity rail and bus service. Transit improvements addressed by this project include enclosed pedestrian waiting areas, weather protected canopies, bike storage lockers, parking, and street landscaping.

On February 4, 2002 the Everett Station was formally introduced to the public at its ribbon cutting



From left to right: Dr. Sylvia Mundy, Employment Security Commissioner; Congressman Rick Larsen; Governor Gary Locke; Mayor Ed Hansen; Dr. Karen Morse, President of Western WA University; Helen Knoll, FTA Regional Administrator; and Dave Earling, former Sound Transit Board Chair

ceremony. Joining Everett Mayor Edward D. Hansen were Governor Gary Locke, TIB Chair Rob McKenna, and other distinguished guests.

Two grants from TIB provided \$4 million towards the design and right of way phases of the project. The total project cost was \$33 million. This project is a model of

what the Public Transportation Systems Program accomplished. The mingling of state, federal, private, and local funds for this project provided an improved and unique facility, which will encourage economic development and reduce congestion. ▲



Words from the Chair

Here we are on the eve of a new maintenance and construction season where all the energies and talent of the various road and highway departments in the Northwest will seek to improve and rebuild the infrastructures we are in charge of maintaining. I am always reminded of the problems of safety, manpower, costs, and bureaucracy in the process of this work, although the last is always a maze of frustration and humor to everyone.

With the economic downturn we are experiencing in the country and in our own states, I am sure that manpower and costs will be a problem to some agencies. How to cope with this fact is not something any organization wishes to experience at any time. Now having stated this, I would ask that the organization members might offer suggestions and ideas on how to get through this period to those agencies having problems with funding and manpower. I realize that helping others to solve problems while we have our own may be a lot to ask, but I do believe it is the right thing to do.

I would ask that the organization members might offer suggestions and ideas on how to get through this period to those agencies having problems with funding and manpower. I realize that helping others to solve problems while we have our own may be a lot to ask, but I do believe it is the right thing to do.

The strength of the NWPMA is in our cooperation and willingness to exchange ideas and to alert our neighbors to new pavement improvement methods and funding sources.

Here in the Ada County Highway District we apply for Federal funds each year for overlays. In this construction year we have been given enough funds to overlay some 8 miles of surface. This is in addition to county funds for overlays, which is 12 miles of additional improvements. We have also applied for funds for chipseals in 2004; this has been approved at this time.

I do hope to see you at the spring conference in April and come with ideas to discuss and information to share.

Have a safe construction year and remember there are crazy drivers out there.

George Alton,
Chairman NWPMA





Deanna S. Peck

August 9, 1963–January 7, 2002

*Tragedy strikes the Oregon pavement management community.
Our sympathy to all who knew and worked with Deanna.*

SALEM — Deanna S. Peck of Salem died Monday, January 7, 2002, at age 38 from complications of leukemia at Sunnyside Kaiser Hospital in Portland, OR.

She was born on August 9, 1963 to Dan and Ellen Cutshall Kilmer in Walla Walla, WA.

She attended Milton-Freewater elementary schools and graduated from McLoughlin Union High School in 1981.

She attended Northwest Nazarene College and Walla Walla Community College where she earned an Associate of Arts degree.

She worked for Blevins Oil Company for one year and then for the City of Milton-Freewater in the Public Works Department for four years.

She married Donald F. Peck, Jr. on August 22, 1987 in Walla Walla, WA. After moving to Salem, she worked for Marion County Public Works Department for the last 12 years and most recently as Contracts Coordinator.

Deanna loved music. She sang in the A cappella Choir, played piano for Rescue Mission Services, played in the handbell choir, sang in a group called "Homeward Bound," and sang in church trios and quartets with her cousins as she was growing up.

Deanna and her family attend Oak Park Community Church of God where they are all very active. The family is very active in sports programs. She was a great supporter of her children's games.

Survivors include her husband, Don, 3 children: Stefani 11, Tanner 8, Haley 4; her parents, Dan and Ellen Kilmer of Milton-Freewater, OR; one sister, Brenda Demers of Beaverton, OR; one brother, Dwayne Kilmer of Milton-Freewater, OR; her grandmother, Hazel Cutshall of Milton-Freewater, OR; and numerous aunts, uncles, cousins, nieces, and nephews.

Is That “More Secure” Mailbox Really Safe?

Reprinted from Research & Technology Transporter, FHWA-RD-02-019, February 2002

With mailbox vandalism and identify theft from stolen mail on the rise, many homeowners opt for the newer, heavier mailbox designs that promise security. However, little is known about how these heavier mailboxes could impact drivers and passengers in car crashes.

The Federal Highway Administration (FHWA) Office of Safety Design and the American Association of State Highway and Transportation Officials' (AASHTO) Task Force for Roadside Safety are concerned that these new heavy-weight mailbox designs could contribute to serious motorist injury. To study the effects of mailbox impacts they have turned to the FHWA/NHTSA National Crash Analysis Center (NCAC) and the Federal outdoor Impact Lab (FOIL). The FOIL crew will conduct a series of pendulum tests on the windshields of passenger automobiles.

Prior to each pendulum test, a grid of white tape is placed over the curved windshield and the FOIL team scans it with a digitizing arm to measure the initial location of each nodal point. A pendulum test device swings a heavy steel



Windshield after pendulum test with steel ball shows crack patterns and deformations. The test data will be used to make a windshield model for finite element analysis.



The cracks on the windshield radiating outward from the point of impact and the deflection of the nodes on the grid will be scanned into a computer.

ball into the windshield. An accelerometer mounted on the steel ball measures the actual impact force and the loading time history. After the test, the team measures the displaced positions of each node with a digitizing arm.

The FOIL team will run a series of pendulum tests at different speeds and impact locations on the windshield. A few full-scale tests with the secure mailboxes will also be used in the validation process. To date, four pendulum tests were conducted, and as weather permits, the remainder of the tests will be run over the next few months.

NCAC will use the pendulum test data to develop a finite element model of a windshield, which they

will use to evaluate the potential for windshield cracking and penetration under various impact scenarios. To do this, they must develop a material model that accurately represents the material properties of laminated glass.

Upon completion of the study, FHWA will make the results available to the AASHTO Task Force for Roadside Safety in order to develop secure mailbox accommodation guidelines.

For additional information, contact Charlie McDevitt, (202) 493-3313, charlie.mcdevitt@fhwa.dot.gov.



A New and Improved High-Performance Concrete

Reprinted from Accelerating Infrastructure Innovations FOCUS, February 2002

Move over, high-performance concrete (HPC). The next generation of HPC, known as ultra-high-performance concrete (UHPC), is currently being evaluated at the Federal Highway Administration's (FHWA) Turner Fairbank Highway Research Center in McLean, Virginia. The Center's Structures Laboratory is testing two American Association of State Highway and Transportation Officials (AASHTO) Type II prestressed concrete girders fabricated from UHPC. The tests are intended to characterize the girder's structural behavior and determine how well the current AASHTO design provisions represent that behavior.

UHPC is a steel fiber-reinforced reactive powder concrete that typically displays twice the compressive strength of any HPC used in United States bridge construction to date. The French firm Bouygues SA developed the reactive powder concrete, which is engineered to be a highly compacted concrete with a small, disconnected pore structure that helps to minimize many of the limitations of typical HPC. These advancements are achieved through a combination of finely ground powders and the elimination of coarse aggregates.

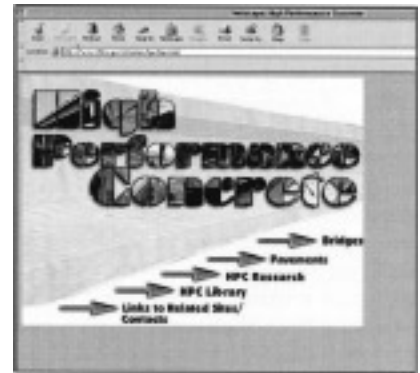
The addition of small steel fibers to the mix is responsible for much of the tensile strength and toughness of the material. These fibers eliminate the need for mild reinforcing steel in the girders.

The placement and curing of UHPC can be performed using procedures similar to those already established for use with some HPCs. The fluid mix is virtually self-placing and requires no internal vibration. If required, external form vibration causes the mix to smoothly flow into place. Following an initial set of 24 hours, the curing process requires at least an additional 48 hours, including a vapor bath at a constant 88 °C (190 °F).

The structural test of the first girder delivered some impressive results. Just prior to failure, the 24-m (80-ft) long girder displayed a mid-span deflection of more than 485 mm (19 in). Even more impressive was the girder's ability to sustain a large load and associated deflection without creep, relaxation, or any visual sign of distress. For example, the flexural test was suspended for more than 12 hours with 300 mm (12 in) of mid-span deflection locked into the girder. During that time, the girder was unchanged, and even with the aid of a 3x magnifying glass there were no detectable cracks.

To date, three additional structural tests designed to determine the shear capacity of the UHPC girders have been completed. These tests revealed that the shear capacity of a UHPC girder without shear reinforcement is approximately two to three times that of a conventionally reinforced prestressed concrete girder.

FHWA's testing of UHPC has revealed it to be a promising addition to the HPC currently being used by the bridge construction industry. FHWA plans to conduct additional tests that will fully characterize the material,



Learn more about FHWA's high-performance concrete research at www.tfhrc.gov/structur/hpc/hpc.htm

and once the behavior of UHPC is understood, its use in bridge construction will be further investigated. Joey Hartmann of FHWA says, "UHPC is a very promising material that will have multiple applications, but there will need to be further application development to make it efficient."

Numerous other countries are already employing UHPC. Canada and South Korea have used UHPC for pedestrian bridges, Portugal has employed it for seawall anchors, Australia has committed to its use in a vehicular bridge, and France has used it in building power plants. In all of these cases, the material was chosen for its ability to stand up to high stress, both environmental and local related. The increasing deployment of UHPC worldwide and FHWA's initial testing results for the product bode well for its future use.

For more information on UHPC, contact Joey Hartmann at FHWA, (202) 493-3059 (fax: (202) 493-3442; e-mail: joey.hartmann@fhwa.dot.gov). ▲

Portable Speed Bump Keeps a Safe Work Zone Around Flaggers

Reprinted from Research & Technology Transporter, FHWA-RD-02-019, February 2002

In most cases, motorists entering a work zone decrease the speed of their vehicles and drive more carefully; however, some drivers become frustrated or impatient with traffic delay, making flaggers susceptible to potential injury. In New York, alone, there were five flaggers struck in work zones last year.

Taking part in a program cosponsored by the Federal Highway Administration (FHWA) and the California Department of Transportation (CALTRANS), a Mexican engineer participating in the FHWA-funded CALTRANS-Baja California Personnel Exchange Program, created an imaginative new solution for making work, crash, and incident zones safer — portable speed bumps.

Called the Advance Traffic Warning System (ATWS), the speed bumps are actually an 11' x 3'6" (3.35 x 1.07 meter) mat made of a flexible, yet sturdy, rubber with a polyurethane backing, built around woven fiberglass. The mat

thickness, reflective material, and reflective circular ceramic tiles act as rumble strips (like those often seen in crosswalks), and provide a compelling reason for drivers to decrease vehicle speed when approaching a flagger. Best of all, it's so portable, lightweight, and easy to handle that it can be quickly folded up and moved along work zones within minutes.

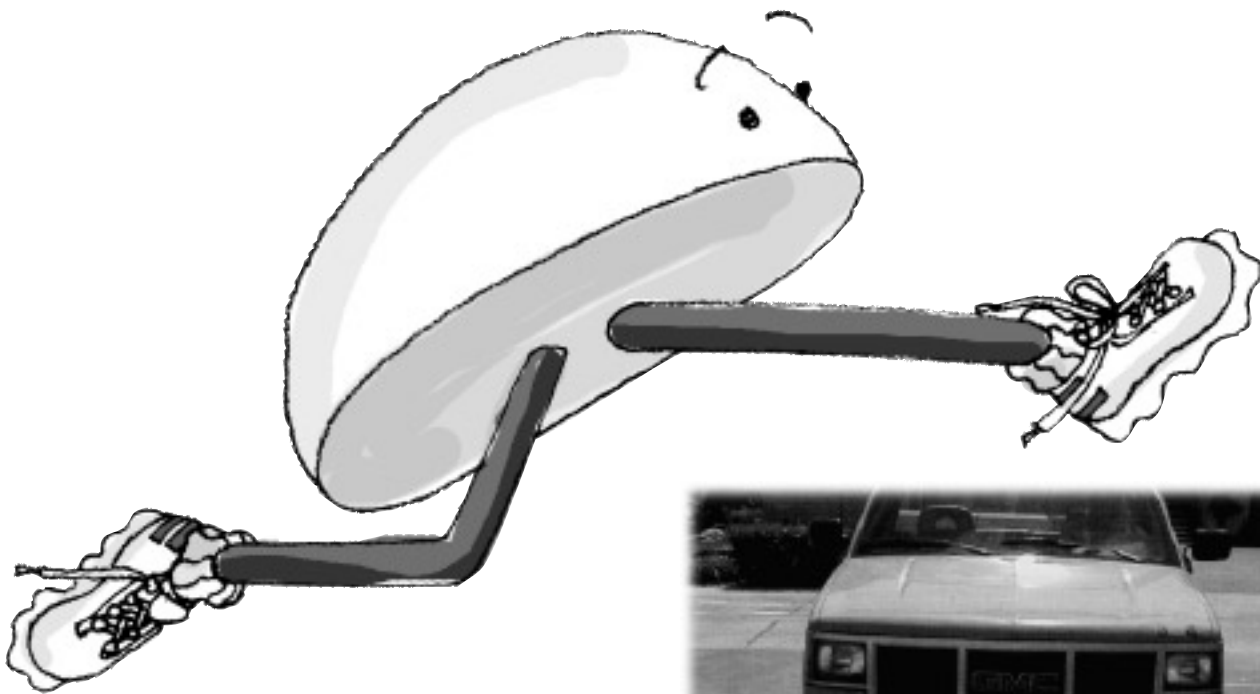
Other benefits of the portable speed bumps include resistance to water, grease, and oil. The composite material remains flexible, even in freezing temperatures, and resists rips, tears, and cuts. The ATWS will sustain any direct pressure on it, and its highly reflective stripes and reflective coating enable workers to use the speed bumps at night.

Although not approved by CALTRANS, if proven effective, this ATWS speed bump invention could become one of many success stories from the U.S.-Mexico Border Technology Exchange Program (BTEP), created and funded by the FHWA Office of International programs. The BTEP is a binational program headed by the

FHWA and Mexico's counterpart, the Secretariat of Communications and Transportation (SCT), and it includes all 10 Departments of Transportation sharing the southwestern international border with Mexico.

Begun just before the North American Free Trade Agreement was passed, the BTEP program encourages a cross-cultural, multinational sharing of ideas and technology among Mexican municipal, State, and Federal transportation agencies. In the case of California, the BTEP includes Metropolitan planning organizations, and universities from California and Baja. The fundamental philosophy of the BTEP is to train individuals from both countries to develop safer roads and to facilitate better coordination of Mexican and U.S. transportation-related projects.

For more information, contact C. Tere Franceschi, (202) 366-9775, c.tere.franceschi@fhwa.dot.gov. ▲



(Top) Portable speed bump acts like a rumble strip to slow the speed of a car driving over it.



(Left) Construction worker shows how easily the portable speed bump can be folded for movement from location to location or storage.



*By Roger
Chappell,
WST2
Technology
Integration
Engineer,
WST2 Center*

Data Mining and Digging for Gold in Your Own Backyard

Since coming of age in the information age, I grew up believing in resource sharing, data partnerships, and leveraging data resources whenever possible. To me these are not just pious platitudes or buzz words that reflect what is currently in vogue. I hope these and similar concepts are well integrated into your corporate culture. Unfortunately all too often, what has been termed as "data silos" is the rule rather than exception. Even within the same agency data silos flourish. For example, engineering doesn't communicate with planning and vice versa. Each discipline tends to have its own data management system to meet corporate responsibilities. These proprietary systems function very well for the task they were intended to perform, but all too often, little thought is given to their role in a comprehensive enterprise-wide corporate data structure. In other words they work well independently but not interdependently. With the maturing of GIS (Geographic Information System) technology, many of the old data silos are being torn down and data marts or data warehouses are being constructed in their place. This is a good step in the right direction, but we still have along way to go. Implementation of integrating corporate data resources will depend on your

agency's corporate culture and management. If you want to get the most of an enterprise-wide GIS system, you will need to get your internal house in order, while at the same time establish long-range strategic data partnerships.

The reason for establishing long-range strategic data partnerships is that one of the most expensive parts of any data management system is the collection and processing of the data itself. Resource sharing, leveraging data resources, and data partnerships need to be a priority in our long term strategic GIS planning efforts. I have seen federal, state, and local agencies pay good money to have the same area of ground aerial photographed or space imaged. I believe looking outside our corporate silos and forming interagency data partnerships could avoid much costly expenditure. These data partnerships are what I call "digging for gold in your own backyard."

Recently I attended a URISA (Urban and Regional Information Systems Association, www.urisa.org) conference where I discovered one of these golden nugget resources; the Washington State URISA URL at www.waurisa.org. Groups like these are a good place to network with people who have similar interest. At this particular conference

I attended many informative sessions but Nicole McCoy, with the Kittitas Conservation District, gave a session that caught my attention for writing this article. Since my interests are mostly involved in roadway infrastructure, I had never thought about data sharing with a conservation district. To my surprise, conservation districts have a lot of information about the physical environment that surrounds roadway infrastructure. In the article entitled "GIS Making Headway at Conservation Districts" found on the next page, Ms. McCoy shares some of what she presented at the conference. I hope that you also find conservation districts to be good resources and data partners.

Aside from users groups and conferences, where do you find candidates for forming data partnerships? In a previous article, I announced a website that I have started for the main purpose of geodata and resource sharing. It is located at URL:

www.wsdot.wa.gov/ta/T2Center/Mgt.Systems/InfrastructureTechnology/InfThp.html.

Look for partners in unusual places. Many of the local emergency management agencies are looking for spatial data. With all the issues stemming from September 11th and the terrorist

GIS Making Headway at Conservation Districts

attacks, there is a great interest in spatial data for risk assessment both nationally and locally. Whether you are involved with emergency response activities or not, this group is a good place to look for data sharing opportunities at the local level. Emergency management agencies are also beginning to break down their own emergency response “silos” and invite private medical facilities, public and private utilities, communications, and other entities to share data.

The old adage “Not all that glitters is gold” may be apropos at this point. At times developing data sharing agreements within the same local agency can be difficult. In data sharing partnerships, consortiums, and resource pooling there are a lot of negotiations that take place. Competing interests in these types of activities will be prevalent; however, work for a win-win situation.

In this article I hope that I have encouraged you to either start digging or keep digging to discover what treasures may be found in your own backyard. ▲



GIS training at WADE conference

By Nicole McCoy, Kittitas County Conservation District, Ellensburg WA

Until recent years, most Conservation Districts (CDs) in Washington State didn't use GIS in conservation planning because they didn't have the technical or staff resources to support it. GIS in conservation planning wasn't used until the mid 1990s and even then, there were only a handful of CDs that utilized the technology. With the growing need for GIS at CDs, the Kittitas County Conservation District, took the initiative to seek funding for a statewide GIS training program using ArcView. The Washington Conservation Commission funded the pilot project in 1998 and due to its success, also funded “Phase II —

Advanced Applications” in 2000 (to be completed in June 2002). Now, CDs in Washington are taking the lead in GIS among USDA partners.

At this point you are probably curious as to “What are CDs?” In a nutshell, they are a political subdivision of state government that works locally with landowners and the community to meet their conservation needs. CDs have been in operation assisting landowners nationwide since the era of the Dust Bowl! At that time they partnered with USDA Natural Resources Conservation Service (NRCS) (formerly “Soil Conservation Service”) and continue to do so today. They have continued serving land owners for over sixty years by providing sound resource management advice and goal oriented solutions on issues

ranging from managing crop land to stream enhancement.

One of the many benefits of CDs is that there is one near you. Forty-eight CDs are in Washington State; at least one in every county. CDs are strictly funded by local, state, and federal grants. They have low overhead by partnering with NRCS that allows for funds to go directly to programs that benefit landowners. Trust is key at the local level that makes all of the programs work. Locally elected landowners who volunteer their time lead CDs. CDs guide voluntary solutions to address urban and rural issues that affect the community and environment. They work in partnerships with the local communities, schools, and other agencies and organizations to educate youth through hands-on experience; implement best management practices; identify incentive-driven solutions to address Clean Water Act and Endangered Species Act compliance issues; plant trees to improve soil stabilization and wildlife habitat; assist dairies to achieve compliance standards; establish model watershed enhancement projects; and provide technical and financial assistance to land owners. CDs are the bridge that connects landowners with the means to meet compliance standards from state and federal regulatory agencies.

CDs have a voice in the state and federal legislative policymaking process through the Washington Association of Conservation Districts (WACD) and the National Association of Conservation Districts (NACD). The Washington Conservation Commission also supports CDs by administering grant programs. The Washington Association of District Employees (WADE) focuses their efforts on annual CD training conferences that provide training in all areas from administrative to technical. There have been GIS training tracks for the past few years



(Top) Annual summer field tour-demo of on farm technologies to land owners.

(Middle) Multiple CDs discussing their GIS projects.

(Bottom) Multiple agencies working together to find fish habitat solutions.



(Top) Farm Tour-educating students about how to use maps.

(Middle) GPS training for CDs at WADE conference.

(Bottom) Legislative tour using maps to demonstrate on-farm conditions.

that have covered hands-on GPS workshops and applications demonstrations.

Enough about what CDs are. How can CDs be a gem of a resource for you? Because of their rapport with landowners, CDs collect accurate data on private lands. The data can be ownership boundaries, stream features, crop data, etc. They also share an office with NRCS who supplies the USGS soil survey for your area. About 40 out of 48 CDs are currently using GIS at some level. Each CD is different based on climate, region, population, and land use. Depending on the CD, GIS may be used for farm plans, watershed management, endangered species habitat analysis, soils maps, dairy management plans, crop mapping, presentations, and reports. CDs are also using GPS and developing new data sets that target project-specific areas.

There could be a plethora of information that can be acquired from CDs depending on their use of GIS. On that note, CDs should also go to their local GIS resources to share data and keep the communication open.

Check with your local CD to inquire what GIS data they have available. CDs are working on projects that could be beneficial to you. They could be a “gem of a resource”.

To reach CDs in your area go to www.conserver.org. Not only will you find local contacts, but will tap into the Washington Conservation Commission statewide programs and resources they have to offer, including a GIS group forum that anyone can subscribe to.

You may also contact Nicole McCoy, GIS Specialist, Kittitas County Conservation District with any GIS questions related to CDs. 509-925-8585. Email: nicole-mccoy@wa.nacdnet.org. ▲



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| <input type="checkbox"/> Contracting for Professional Services in Washington State, MRSC, 1994 | <input type="checkbox"/> A Guidebook for Residential Traffic Management, NWT2 Center, 1994 | <input type="checkbox"/> Pavement Surface Condition Field Rating Manual for Asphalt Pavement, NWPMA, WSDOT, 1999 |
| <input type="checkbox"/> Engineer's Pothole Repair Guide, US Army Corps of Engineers, CRREL, 1984 | <input type="checkbox"/> A Guide for Erecting Mailboxes on Highways, AASHTO, 1984 | <input type="checkbox"/> Pedestrian Facilities Guidebook, WSDOT, 1997 |
| <input type="checkbox"/> Family Emergency Preparedness Plan, American Red Cross, et al., 1998 | <input type="checkbox"/> Highway/Utility Guide, FHWA 1993 | <input type="checkbox"/> Pothole Primer – A Public Administrator's Guide, CRREL, 1989 |
| <input type="checkbox"/> Field Guide for Unpaved Rural Roads, Wyoming T2 Center, 1997 | <input type="checkbox"/> Improving Conditions for Bicycling and Walking, FHWA, 1998 | <input type="checkbox"/> Rating Unsurfaced Roads, A Field Manual for Measuring Maintenance Problems, CRREL, 1988 |
| <input type="checkbox"/> Fish Passage Through Culverts, FHWA, USDA, 1998 | <input type="checkbox"/> Improving Highway Safety at Bridges on Local Roads and Streets, FHWA, 1998 | |
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| <input type="checkbox"/> General Field Reference Guide (Pocket Size) | | |

- Recommendations to Reduce Pedestrian Collisions, WSDOT, December 1999
- Redevelopment for Livable Communities, Rhys Roth, Energy Outreach Center, 1995
- Sidewalk Details, WSDOT, 2000
- State-of-the-Art Survey of Flexible Pavement Crack Sealing Procedures in the United States, CRREL, 1992
- Superpave System – New Tools for Designing and Building More Durable Asphalt Pavements, FHWA
- Traffic Calming: A Guide to Street Sharing, Michael J. Wallwork, PE, 1993
- Utility Cuts in Paved Roads, Field Guide, FHWA, 1997
- W-Beam Guardrail Repair and Maintenance, FHWA
- Washington Bicycle Map, WSDOT, 2001

Workbooks and Handouts from WST2 Center Workshops:

- Application of Geographic Information Systems for Transportation, FHWA, 1999
- Construction Documentation: Construction Training Manual for Local Agencies, WSDOT, 2002
- Design, Construction and Maintenance of Highway Safety Features and Appurtenances, FHWA, 1997 (update included)
- Flagging Handbook, ATSSA, 1999
- Handbook for Walkable Communities, by Dan Burden and Michael Wallwork
- Highway Maintenance Welding Techniques and Applications, Tom Cook, Cornell Local Roads Program, 1995
- Historic and Archeological Preservation: An Orientation Guide, FHWA/NHI
- Planning and Implementing Pedestrian Facilities in Suburban and Developing Rural Areas, TRB
- Pavement Maintenance Effectiveness/Innovative Materials Workshop Participant's Handbook

- Snow & Ice Control Chemicals, Theory & Practice, Dale G. Keep, Ice & Snow Technologies, LLC,

CD ROM:

- Gravel Roads: Maintenance and Design Manual, SD LTAP, 2000
- Intelligent Transportation Systems Awareness, FHWA, 1999
- Pedestrian/Bicycle Crash Analysis Tool, FHWA, 1999
- Pedestrian/Bicycle Safety Resource Set, FHWA, 2000
- Pavement Preservation: State of the Practice, FHWA, July 2000
- Rockfall Catchment Area Design Guide, ODOT, 2002
- Technology Transfer CD Library Technical Documents, 2002

Non-Credit Self-Study Guides:

These non-credit self-study guides are available through WSDOT Staff Development, and may be obtained from the WST2 Center. An invoice will be sent with these non-credit course materials.

- Basic Surveying, \$20
- Advanced Surveying (metric), \$20
- Contract Plans Reading, \$25
- Technical Mathematics I, \$20
- Technical Mathematics II, \$20
- Basic Metric System, \$20

Computer Programs :

The following computer programs may be downloaded from the Internet at: www.wsdot.wa.gov/TA/Operations/Environmental/Soft.htm

HyperCalc — A shareware utility for converting between metric and English units

APWA Cad Symbol Standards and Menus — A public domain program of standard AutoCAD symbols developed by the Washington Chapter of APWA for use with AutoCAD release 12.

Download the 2001 FileMaker Pro STIP program at www.wsdot.wa.gov/TA/STIP/STIP.HTM.

STIP Too Application (Version 5.4 – July 10, 2001) — This program enables you to manage your Six Year TIP (Transportation Improvement Plan) and send it to your MPO/RTPO and/or your Regional Local

Programs Office for inclusion into the STIP (Statewide Transportation Improvement Program).

On Screen Forms:

- Progress Billing Form (Excel)
- Local Agency Agreement (Form 140-039)
- Local Agency Agreement Supplement (Form 140-041)
- Federal Aid Project Prospectus (Form 140-101)
- Environmental Classification Summary (Form 140-100)
- Bid Proposal Package
- Safety Management System Application
- BRAC Funding Application

Manuals Available on the WSDOT Website:

- A Local Agency Guide to Pavement Management/Streetwise Manuals
- The Local Agency Guidelines (LAG) Manual
- The Local Agency Safety Management System Manual

The following computer program may be downloaded from the Internet at: www.wsdot.wa.gov/fossc/mats/Apps/EPG.htm:

Everseries Pavement Analysis Programs: This series of programs contains three independent modules:

1. **Evercalc 5.0** – A FWD Pavement Moduli Backcalculation Program
2. **Everstress 5.0** – A Layered Elastic Analysis Program
3. **Everpave 5.0** – A Flexible Pavement Overlay Design Program

Important: These programs are updated on a regular basis. Please send your e-mail address to sivanen@wsdot.wa.gov to be included in the mailing list for updates.

The following computer program may be downloaded from the Internet at: www.wsdot.wa.gov/fossc/mats/pavement/fwd.htm:

FWD Area Program - This program is useful in calculating Normalized Deflections Area Value, and Subgrade Moduli from FWD Data.

Videotapes:

- Walkable Communities: Designing for Pedestrians, Dan Burden, \$50/set





*Laurel Gray, WST2
Training Coordinator*

Washington State T2 Center

Contact: Laurel Gray (360) 705-7355
Wendy Schmidt (360) 705-7386
<http://www.wsdot.wa.gov/TA/T2Center/train2.htm>

To register for a class in this section, use the contact listed above.

The class fees shown apply to both public and private sector students.

Anatomy of a Grant: Grantwriting

July 9-10, Vancouver; October 29-30, Yakima; December 17-18, Seattle. **\$150.** In this two-day workshop you'll learn some practical steps to take toward grantwriting and how to approach the right funders for the dollars you need. The class will discuss writing three types of grants: federal, state, and foundations.

Introduction to GPS Mapping Grade Equipment

June 25-27, July 30-August 1, August 13-15, all three classes to be held at WSDOT Olympic Region training room in Tumwater. **\$325.** Only 4 people per session. If an agency has their own equipment, the class can go to 6 people. Other sessions can be scheduled if requested. This training is an introductory course on mapping grade GPS equipment. It is designed to provide basic knowledge and skills in the use of Global Positioning System technology in mission planning, data gathering, and data processing. The training will enable field operation personnel to use new methods and Trimble mapping grade equipment as well as understanding problems encountered when using the GPS satellite constellation. Objectives of course: (1) Understand the Global Positioning System, (2) use mapping products, (3) understand the connection between GPS and GIS, and (4) use Trimble mapping grade equipment and software for mission planning, data collection, and data processing. For planners, technicians, engineers, and designers who will collect GPS data for mapping, use GPS data as an end product, supervise or manage data collection, or who need to use GPS to locate roadway features. Classroom and field exercises.

Drainage Workshop: Construction of Pavement Subsurface Drainage Systems

June 26, 2002, Lakewood. **Free.** This presentation contains detailed information on the design, construction, and maintenance of pavement subsurface drainage systems. The objectives of this presentation are: (1) Provide guidance for the proper construction of permeable bases and separator layers for Portland Cement and Asphalt Concrete Pavements, (2) provide guidance for the proper construction of edgedrain systems, and (3) provide guide specifications for the construction of the various elements of the drainage system. The course is targeted for Federal, state and local highway construction and maintenance engineers.

Snow and Ice Control Chemicals: Theory and Practice

September 17, Pasco, September 18, Colville, October 2, Okanogan, October 3 (by special request), October 9, Bellingham, October 10, Port Angeles. **\$35.** If you would like to host the October 3rd session in your agency, call the T2 Office. Sessions will cover the difference between anti-icing and deicing, when each is appropriate for use, and how to use each method correctly. Included will be information on the advantages and disadvantages of both liquid and solid deicers, how they work, why they work and their limits.

PS&E Contract Preparation

September 24-25, Vancouver; October 15-16, Bellevue; November 12-13, Tacoma. **\$75.** This two-day class covers the preparation of PS&E by WSDOT, consultants, and local agency staff. Instruction will be based on the Plans Preparation Manual as well as other references. The course includes contract special provision writing. It will cover the most recent requirements for preparing complete, biddable, constructable, and defensible plans, and the most recent requirements for writing complete, concise, and well-formatted special provisions.

Advanced Biological Assessment Preparation

September. **\$35.** Instructor: Marion Carey. Topics include biological assessment content, information analysis, making appropriate effect determinations and common problems found in biological assessments. It will also cover conducting Essential Fish Habitat consultations. Students will come away with an understanding of how to complete the contents of the biological assessment such as how to define the action area, and how to make and document effect determinations. Prerequisite: Introduction to ESA and Biological Assessments, or an understanding of the ESA and some experience writing biological assessments.

Construction Documentation

December 4, Vancouver; December 11, Olympia; January 14, North Seattle; January 15, South Seattle; February 11, Olympic Peninsula; February 12, Tacoma; March 11, Spokane; March 12, Moses Lake; March 13, Yakima; April 8, North Seattle; April 9, South Seattle. **Free.** For registration in Northwest Region, contact Dave Engle at (206) 440-4733, all others register through the WST2 office.

LAG Training

Based on the interest we are now seeing, changes have been made to the LAG training program. We are no longer planning to develop training in some areas. Listed below are four courses removed from the program and the ten courses that we now expect to offer. If you have questions you may contact Ron Pate at (360) 705-7383 or Laurel Gray at (360) 705-7355.

Classes are developed in response to interest indicated by the wait lists. Continue to add names to wait lists located on-line at

<http://www.wsdot.wa.gov/TA/Operations/LAG/Lagtrain.HTM>

Courses removed from the program:

- Qualified Testers: Removed as a course, being developed as a program.
- Environmental/Advanced: No demand
- Railroad Procedures: No demand
- Section 106 Process-National Historic Preservation Act of 1966: Subject covered in Environmental/Introduction course.

The ten remaining LAG Program courses:

- Construction Documentation - LAG Manual Chapters 51, 52, and 53. Eleven sessions were recently held. Eleven more sessions coming December thru February.
- Consultants - LAG Manual Chapter 31. Curriculum has been developed through the WSDOT Consultant Liaison office and TRANSPEED. Cost will be \$150 per person. Available by spring 2002.
- Disadvantaged Business Enterprise (DBE)/EEO/OJT - LAG Manual Chapters 26 and 27.
- Design Standards from PS&E to Award - LAG Manual Chapters 42-46. T2 offers many PS&E training sessions every year. See Page 52 for scheduled classes. Cost is \$75.
- Emergency Relief Program - LAG Manual Chapter 33. Training in October/November 2002.
- Enhancement Program - LAG Manual Chapter 62. About a year away from training, waiting on a new Federal act.
- Environmental/Introduction - LAG Manual Chapter 24. This includes Section 106 Process. Classes to be developed based on interest.
- Funding Workshop - LAG Manual Chapters 12, 21, 22, and 23. Agreements and supplements, prospectus, progress billings. Classes already held. More will be scheduled based on interest.
- Right of Way Procedures - LAG Manual Chapter 25 and the Federal Perspective. Some classes have already been held. More will be scheduled this year based on interest.
- LAG Manual Overview - Classes already held. More will be scheduled based on interest.

The Endangered Species Act 4(d) Training Program

The Regional Road Maintenance ESA Program Guidelines is nearing the end of the approval process. The program was published in The Federal Register with a public comment period of thirty days, which was extended to sixty days. The public comment period has closed and the National Marine Fisheries Service is now evaluating final approval. The University of Washington's TRANSPEED program is coordinating and presenting the training program from April 2002 until June 2003 while WST2 pursues funding to continue the training program.

Classes have been scheduled and agencies that have committed to the Regional Road Maintenance Program (RRMP) Guidelines by submitting a "Part 3 Application" will be given priority for spots in the classes.

Tuition costs have now been determined for all tracks and are shown below.

The Part 3 Application, which is a commitment to ten program elements (of which the training program is Element #4), can be obtained from the following web site: <http://www.metrokc.gov/roadcon/bmp/pdfguide.htm> or by contacting Janine Johanson at METRO KC (206) 205 7101.

Four ESA Training Tracks

During the development of the ESA courses, an implementation plan evolved to form four training tracks. The complete ESA training plan has been grouped into four separate tracks: (1) Briefing for regional level decision makers, (2) a training course addressing design and technical BMP procedures involved in roadway maintenance activities, (3) a training course that addresses field crew BMP practices involved in roadway maintenance activities, and (4) courses that develop agency level trainers who are selected by those agencies desiring in-house training capability. Track 4 is further divided into two areas: Track 4A will teach individuals instruction skills to teach the technical portion of the program, and Track 4B will teach individuals instructional skills to teach the field crew portion.

The purpose of the consolidation is to shorten the time agency personnel would be involved in training and to present the training in an "operational teamwork" environment. The training also is intended to emulate, where appropriate, team approaches most agencies could or do employ on roadway maintenance and operational activities. The ultimate objective is to provide consistent training packages to train agency field crew staff, supervisors, and managers on procedures meeting the requirements of ESA for application to roadway maintenance.

- **Track 1: Briefing for Regional Decision Makers**
2 hours. **No fee.** An overview of the ESA program for regional level management and administration. This is a stand-alone training class and not part of the required training program. Offered by members of the Regional Road Maintenance Forum. Call Roy Harris or Gerry Crum at (425) 257-8800 for information. Information may also be obtained from the web site or by calling Janine Johanson at METRO KC (206) 205 7101.

- **Track 2: Introduction, Design and BMP's, Monitoring, and Environmental Roles for Technical and Scientific Staff**
2 days. **\$225** per person. This course is a combination of the various procedures for technical, professional and environmental staff, supervisors and leads involved in maintenance activities. The track is an overview addressing: introduction to the Guidelines, design, habitat, ten program elements and maintenance BMP's to meet ESA requirements.
- **Track 3: Introduction and Outcome-based Road Maintenance**
1 day. **\$160** per person. This course is a combination of the various procedures for field crews and leads involved in maintenance activities. The track is an overview addressing: introduction to the Guidelines, design, habitat, environmental roles, ten program elements and implementation of maintenance BMP's to meet ESA requirements.
- **Track 4A: Train-the Trainer for Technical/Scientific Staff**
1 day. **\$210** per person. For agency-selected ESA trainers. This is the training track to train, evaluate, prepare, and certify candidates to teach the RRMP Track 2.
- **Track 4B: Train-the-Trainer for Field Crews and Supervisors**
1 day. **\$230** per person. For agency-selected ESA trainers. This is the training track to train, evaluate, prepare, and certify candidates to teach the RRMP Track 3.

TRANSPEED University of Washington

Contact: Christy Roop
(206) 543-5539, fax (206) 543-2352
<http://www.engr.washington.edu/epp>

To register for a class in this section, use the contact listed above.

The prices in this section are for local agency/non-local agency.

Basic Highway Capacity 2000

June 11-13, Spokane. **\$265/\$465.** This is the first of two courses in the highway capacity series that combine to provide comprehensive insights into all aspects of capacity and level-of-service analyses for highway, transit, pedestrian, and bicycle facilities. This course will provide participants with a basic understanding of fundamental concepts underlying the analysis methods contained in the 2000 edition of the Highway Capacity Manual. Upon completion of the course, participants should be able to successfully undertake basic facility evaluations, and should also be able to appropriately review and interpret the results of analyses conducted by others.

Manual on Uniform Traffic Control Devices

June 24-26, Seattle; July 29-31, Yakima. **\$265/\$465.** In a new three-day format, this course will cover the FHWA 1988 MUTCD which has been adopted by the WSDOT as the state sign manual. There have been many changes to the 1988 MUTCD as well as the 1993 edition of Part VI of the MUTCD. Lectures will be used to acquaint participants with application of effective design and installation concepts for traffic control devices. Legal, administrative and operational issues will be discussed. The overall objective of this course is to train personnel to provide the safest and most efficient traffic control devices. Specific objectives are for participants to gain an understanding of each step involved in providing traffic controls; identify and apply workable concepts and techniques; better understand the principles in the design and installation of traffic control devices; discuss techniques and procedures used by different agencies; assess the legal consequences of action and inaction relative to traffic control; and identify risk management techniques.

Managing Scope, Schedule and Budget

August 26-28, Seattle. **\$645/\$845.** This three-day training explores practical methods used by successful project managers in the public and private sectors. It covers understanding the work breakdown structure; managing the scope of work; preparing a schedule that can be managed effectively; tracking milestones on the critical path; budgeting work in ways to facilitate cost control; managing risk and change; and how to recover when things go wrong. A highlight is the daily Management Clinic, where participants can get advice for improving their current projects.

Engineering Professional Programs (EPP) University of Washington

Contact: Emily West
(206) 543-5539, fax (206) 543-2352
<http://www.engr.washington.edu/epp>

*To register for a class in this category use the contact listed above.
The prices in this section are for early registration/late registration.*

Engineering Refresher Courses

Three courses offer engineers intensive preparation for the state of Washington qualifying examinations. Evening course sessions will be held on the campus of the University of Washington in Seattle. Experienced faculty teams from the UW College of Engineering present a review of topics relevant to each examination. Course sessions focus on background theory and selectively emphasize problem solving and solutions methods.

FE/E.I.T. Exam Review Course

September 4 - October 15, 2002. **\$525/\$75.** Early registration ends August 21, 2002 Monday & Wednesday, 6:30 - 9:00 PM

Mechanical PE Exam Review Course

September 10 - October 17, 2002. **\$645/\$95.** Early registration ends August 26. Tuesday & Thursday, 6:30 - 9:00 PM

Civil PE Exam Review Course

September 12 - October 17, 2002. **\$525/\$75.** Early registration ends August 27. Tuesday & Thursday, 7:00 - 9:30 PM

Professional Engineering Practice Liaison (PEPL) University of Washington

Contact Stephanie Strom
(206) 543-5539, fax (206) 543-2352
<http://www.engr.washington.edu/epp>

To register for a class in this category use the contact listed above.

Stormwater Treatment by Media Filtration

October 8-9, Seattle. **\$535 before September 24, \$575 thereafter.** Advances in filtration continue with new media and new configurations. The various types of filtration systems covered in the course include traditional flat bed, radial, submerged, porous pavement, and road shoulder configurations. The types of media discussed include sand, coated-sand, perlite, leaf compost, zeolite, peat, fabric, and specialty media. Proprietary technologies presented include StormFilter, AquaFilter, StormTreat, and drain inlet devices. How sizing a system for the removal of dissolved pollutants differs from the traditional sizing approach is discussed. The use of solids loading rather than flow loading to size filters is presented. The latest performance data are presented. A tour of local systems is included. The course provides attendees with an overview of national and local experience, basic engineering principles, and a thorough understanding of methods to size filtration systems.

CONFERENCES

Pacific Northwest Transportation Technology Expo

September 11-12, Grant County Fairgrounds, Moses Lake.

Contact: WSU Conferences and Professional Programs
Phone: 1-800-942-4978 or (509) 335-3530
wsuconf@wsu.edu

NorthWest Pavement Management Association (NWPMA) Fall Conference

October 1-4, 2002, West Coast Hotel, Kennewick.

Contact: Bob Brooks at WSDOT for information
Phone: (360) 705-7352.

Road and Street Maintenance Supervisor's School

East Side: October 1-3, Spokane.

West Side: December 3-5, Tacoma.

Contact: Kelly Newell at Washington State University
Phone: 1-800-942-4978

Washington State Chapter APWA Fall Conference

October 29-November 1, 2002, Spokane.

Contact: Katy Allen at (509) 625-6300 for information.





*The
"Better Mousetrap"
is awarded each quarter
for the most innovative
working ideas presented
by a public agency and
published in WST2.*

Award:

The best concepts will be published in the WST2 and posted on the WST2 Web Page.

Published mousetraps will receive a "Better Mousetrap" baseball cap and certificate.

Published mousetraps will be included in competition for the annual "Crystal Mouse" award.

Eligibility:

Washington State Public Agencies.

Mail To:

"Better Mousetrap"
WST2 Center/WSDOT
P.O. Box 47390
Olympia, WA 98504-7390

E-mail:

WST2Center@wsdot.wa.gov

For questions:

Dan Sunde, Director of Technology Transfer
SundeD@wsdot.wa.gov
(360) 705-7390

"Better Mousetrap" Submittal Form

Name of the "Better Mousetrap":

Submitter's Name:

Title:

Agency:

E-mail Address:

Address:

City:

State:

Zip+4

Phone Number : ()

Developer's Name(s):

Title:

Agency:

E-mail Address:

Address:

City:

State:

Zip+4

Phone Number : ()

Description of the "Better Mousetrap"

Why was it necessary?

How does it work?

How was it built? (Include Sketches, Photos, Drawings)

How does it perform?

**Please add a sketch with dimensions and materials used!
We will draw plans from them so others can build it too!**

WSDOT Local Programs Engineers

Eastern Region (Spokane)

Keith Martin (509) 324-6080, MartinK@wsdot.wa.gov
 Jerry Lenzi, P.E., Regional Administrator (509) 324-6010,
LenziJC@wsdot.wa.gov

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North Central Region (Wenatchee)

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South Central Region (Yakima)

Roger Arms (509) 577-1780, ArmsR@wsdot.wa.gov

Southwest Region (Vancouver)

www.wsdot.wa.gov/regions/SouthWest/localprograms
 Bill Pierce (360) 905-2215, PierceB@wsdot.wa.gov

Legal Search

Search RCW's and WAC's

<http://search.leg.wa.gov/pub/textsearch/default.asp>

Traffic Technology

National Highway Traffic Safety Administration

www.nhtsa.dot.gov

WSDOT Traffic Data Office

www.wsdot.wa.gov/ppsc/TDO/tdo_hp.htm

Washington State Patrol

www.wa.gov/wsp/wsphome.htm

Washington Traffic Safety Commission

www.wa.gov/wtsc

American Traffic Safety Services Association

www.atssa.com

Municipal Research and Services Center of Washington

www.mrsc.org

Transportation Research Board

www.nas.edu/trb/index.html

Training

American Public Works Association

www.apwa.net/education

County Road Administration Board

www.crab.wa.gov/pubs/catalog.pdf

Washington State Technology Transfer Center

www.wsdot.wa.gov/TA/T2Center/TRAIN2.HTM

LAG training site

www.wsdot.wa.gov/TA/Operations/LAG/Lagtrain.HTM

FHWA's Pedestrian Workshop Available Free of Charge

www.ota.fhwa.dot.gov/walk/index.html

Transportation Partnership in Engineering Education Development (TRANSPED)

<http://www.wsdot.wa.gov/ppsc/research/review.htm>

Pavement Management

NWPMA — Northwest Pavement Management Association:

www.wsdot.wa.gov/ta/T2Center/Mgt.Systems/PavementTechnology/nwpma.html

Asphalt Institute:

www.asphaltinstitute.org/

National Asphalt Pavement Association:

www.hotmix.org/

Pavenet (A Web Site for Managing Pavements)

www.mincad.com.au/pavenet

SuperPave Information

www.utexas.edu/research/superpave

Infrastructure Management and GIS/GPS

*This site has been established to promote interagency data exchange and resource sharing between local governmental agencies.

www.wsdot.wa.gov/TA/T2Center/Mgt.Systems/InfrastructureTechnology/InfThp.html

Environmental

Regional Road Maintenance Endangered Species Act Program Guidelines

www.metrokc.gov/roadcon/bmp/pdfguide.htm

National Marine Fisheries Service Species Listings & Info

www.nwr.noaa.gov/1habcon/habweb/listnwr.htm

US Fish & Wildlife Service Species Listings & Info

<http://endangered.fws.gov/>

National Marine Fisheries Service's Home Page

www.nwr.noaa.gov

U.S. Fish and Wildlife Service's Home Page

www.endangered.fws.gov

Washington State DNR's Natural Heritage Program Home Page

www.wa.gov/dnr/htdocs/fr/nhp/refdesk/fsrefix.htm

FHWA's Environmental Home Page

www.fhwa.dot.gov/environment/genrleov.htm

Bridge

WSDOT Highways and Local Programs

www.wsdot.wa.gov/TA/Operations/BRIDGE/BRIDGEHP.HTM

Research

WSDOT Research Office

www.wsdot.wa.gov/ppsc/research/other.htm

Looking for a Transportation Research Publication?

www.nas.edu/trb/index.html

Municipal Research and Services Center of Washington

www.mrsc.org/

Other Resources

LTAP (Local Technical Assistance Program) Clearing House

www.ltapt2.org/data.htm

Institute of Transportation Engineers

www.ite.org

FHWA's New Pedestrian Sites, With Great Information Including Design

www.walkinginfo.org

www.bicyclinginfo.org

WSDOT Pedestrian Safety Demonstration Project in Shoreline

www.otak.com/shorelinepedsafety

Washington State Counties

<http://access.wa.gov/government/awco.asp>

Washington State Cities and Towns

<http://access.wa.gov/government/awcity.asp>

Governor's Office of Indian Affairs, Washington State Tribal Directory

www.goia.wa.gov/directory/toc.html

Southwest Interagency Coop — Grounds Equipment Maintenance (GEM)

www.gematwork.org

Highways and Local Programs List Serves

Local Agency Guidelines (LAG) Manual

<http://lists.wsdot.wa.gov/guest/RemoteListSummary/LAGG>

Traffic and Safety Management

<http://T2SMS-L@lists.wsdot.wa.gov>

Pavement Management

<http://T2PAVE-L@lists.wsdot.wa.gov>

WSTS Newsletter

<http://T2News-L@lists.wsdot.wa.gov>

Training

<http://T2TRNG-L@lists.wsdot.wa.gov>





...A Request or a Plea?

Believe it or not this is actually a sign in downtown Washington DC (note another one across the street at the bottom of the page). Apparently certain intersections have the problem of motorists stopping in the middle of the intersection during heavy traffic blocking other traffic while they wait for the light to change. This is the District's attempt to remedy the problem.

Sign of the Times

Do you have a humorous traffic sign to share? Send us a print or e-mail a digital image (preferably a 300 dpi, 1000 x 1500 dpi jpg or tiff) and we will add it to our collection for publishing. Please provide your name, title, agency or company, and a short description of where and when you saw the sign. We want to give you credit for your participation. You can e-mail the image to SundeD@wsdot.wa.gov or mail the photo to:

"Sign of the Times"
WST2 Center
PO Box 47390
Olympia, WA 98504-7390

Please don't send your original photo. Although we will do our best to return the photo, we can't guarantee it.



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E-mail
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WST2 Web Site
www.wsdot.wa.gov/TA/T2Center/T2hp.htm

Toll Free Training Number
1-800-973-4496

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